JAMAICA

ANNUAL REPORT

OF THE

DEPARTMENT OF AGRICULTURE

FOR

THE YEAR ENDED 31ST DECEMBER, 1929.

Ordered by His Excellency the Governor to be Printed.

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1930.

HOPE GARDENS: ENTRANCE VIEW.

HOPE GARDENS: THE LAWNS.

DEPARTMENT OF SCIENCE AND AGRICULTURE.

Report for the year ended 31st December, 1929.

I.—GENERAL OBSERVATIONS.

On reviewing the records of the year, 1929, it must be admitted that it was on the whole a good year for Jamaica, despite the severe drought in St Elizabeth and the depression in some lines of the export trade of the Colony which was experienced. This result was mainly brought about by the expansion of the Banana Trade and the benefits arising from the new co-operative movement and its new line of ships to Europe, together with the inauguration of the Canadian Government ships which carried bananas and other products of Jamaica in direct bottoms to Dominion ports.

The island rainfall was again below the average with a record of only 60 inches instead of 76 inches. On the southern portions of the island acute drought conditions persisted for several months but providentially, light rains fell in the banana areas so as to enable the highest number of stems ever shipped from Jamaica to be produced (22,047,536 stems equal to 14,118,571 "count" bunches of nine hands or over, valued at £2,509,878). A feature of this trade was that a large number of small six-hand stems (four counting as one bunch) were shipped to Europe by the co-operative association. The total value was the greatest in the history of the banana trade of the Colony—the previous record having been made in 1927.

The difficulties to be faced in establishing the new line of steamers and in invading the banana markets of Europe and the United Kingdom were very great and the producers are to be congratulated on the results which have been already secured by their co-operative efforts. The planting of bananas continues to extend and if no untoward circumstances intervene, the crop of 1930 should show a still higher record. Meanwhile the restrictive influence of Panama Disease is becoming increasingly felt particularly in the parishes of Portland and St. Mary. The results of our control of Panama Disease, under the Order for the year 1929, were disappointing as a higher rate of increase was experienced than in the previous year. This result was mainly due to the neglect of owners to deal with the disease in the most careful way. Cases of hiding disease and neglect of quarantine were very prevalent in some districts, with the result that a disastrous spread of disease took place. From the nature of Panama Disease its control involves economic sacrifice to the owner and in the desire to avoid an immediate loss of crop, those who have hidden disease or treated it improperly, have in the end suffered severe losses of banana land from the rapid spread of Panama Disease which takes place when adequate quarantine is not effected.

The production of banana seedlings has continued to engage our serious attention, but owing to "Northers" which played havoc at Castleton, in November, 1928, and again in January, 1930, a very large number of pollinated bananas were destroyed. Three hybrid seedlings obtained from the Jamaica Banana crossed with the "Robusta" variety have been found to be highly resistant to Panama Disease and to offer some usefulness to planters in infected areas. The fruits are too short in the finger to equal the "Gros Michel" but are otherwise good bananas and suitable for emergency cultivation, until the better banana has been produced.

It is encouraging to find that the "Gros Michel" is capable of yielding seedlings which are immune or highly resistant to Panama Disease and themselves of good edible quality. It would appear that the time has now come for attempts at the mass-production of banana seedlings, so that many thousands of hybrid bananas may be available for selection. Several lines of breeding, particularly with non-edible species of Musa, have been abandoned and efforts are now being concentrated on producing seeds from the "Gros Michel."

Coffee suffered from drought conditions in certain areas and the exports fell from about 9 million to a little over 6½ million pounds. Blue Mountain Coffee was in good demand and the highest recorded price for this luxury article was obtained in the London market during the year. The difficulties in Brazil and the consequent demoralisation of the market for ordinary coffee have recently caused a drop in price for the lower grades of Jamaica coffee. There is, however, no reason to lose faith in this well-tried staple and the continuance of the co-operative efforts in manufacturing and marketing a better quality of small holders' coffee is to be commended.

Cacao showed an increase in quantity from 5 to about 6¾ million pounds. The inspection of cacao by the Produce Inspectors has ensured a better standard of the cured product for export. The price of cacao is now low due to over-production and a congestion of markets. No new plantings of cacao are to be observed and growers generally consider that this product is not very encouraging under present conditions of price. A good deal of old cacao has been cut down and replaced by bananas.

Coconuts and Copra have gained in quantity and the output of nuts almost reached the forty million mark. The market for nuts is at present poor and the immediate outlook is not very encouraging. It would appear that the present moment is an opportune one for embarking on a Co-operative Coconut Oil Factory, so that planters could gain some advantage from the protected local market for coconut oil.

The copra cake is in strong demand locally for feeding dairy cattle. An excellent soap is now being made from coconut oil that finds a ready sale in the local market.

Sugar did better than might have been expected with an export record of 37,380 tons, valued at £482,952. Most estates covered expenses or made a small profit due to improved yields of cane from the fields.

Towards the end of the year a crisis arose in this industry, all over the West Indies, due to the fall in price of sugar below the cost of production. The West Indaia Sugar Commission, under the Chairmanship of Lord Olivier, a former Governor of Jamaica, visited the West Indies including this Colony to advise as to some measure of relief for the salvation of the West Indian Sugar Industry. The Legislature of Jamaica took prompt measures for securing temporary relief by arranging for a bounty of £2 per ton for all sugars exported and for an equitable allocation of the profits arising from the small but protected local market for grocery sugars.

This financial crisis is particularly unfortunate because the planters have been making marked strides in the cultivation of improved canes, in deep tillage, irrigation, the use of lime and fertilisers whereby greatly improved yields of canes have been obtained for purposes of manufacture. Of new seedling canes BH (10) 12 is the most generally successful.

The new Java canes P.O.J. 2725 and P.O.J. 2878 are expected to prove of decided advantage to cane planters and are being distributed as rapidly as stocks permit.

Rum is kept as low as possible by the estates owing to difficulties of sale. The high-flavoured rums were in good demand and some satisfactory prices were obtained for this class of rum. Ordinary rums were slow of sale and the prices low.

Honey did fairly well with an export of 1,850,000 lbs. priced at over £21,000. The recent change in the German Tariff has shut out this important market for Jamaican honey. It is hoped that co-operative efforts may place the honey industry on a much better footing as regards quality, grading and the marketing of the product.

Logwood continues to be depressed and it is difficult to secure a market for the wood while the manufacture of logwood extracts continues at a low standard of production. This industry is a valuable one to Jamaica, as it affords a good deal of labour while giving employment for skilled workers in the local factories. It is to be hoped that a recovery of prosperity may soon be experienced in this product of the Colony.

Pimento soared to record standards of price and £348,000 was received for a crop of over 9 million pounds weight of pimento. The price has since fallen to a lower level, but the prospects for the next crop are considered to be encouraging. A co-operative scheme for marketing pimento has been organised, with the object of reducing the injury done to the trade by speculators, which did so much damage during the past year. Pimento leaf oil is still found to be a profitable product, particularly where non-bearing or "male" pimento trees are plentiful.

A Proclamation prohibiting the export of living seeds or plants of the pimento tree was issued by His Excellency the Governor during the year.

Animal Industry.—No outbreak of Foot and Mouth Disease or of Anthrax occurred during the year. The Government Stock Farm at Hope had a successful year and was able to complete the large Tropical Dairy Building, besides importing some very fine sires out of its current revenue. The thanks of the Colony are due to the Earl of Lonsdale for the generous manner in which he made it possible for us to obtain the splendid thoroughbred stallion "Royal Highness" by "The Tetrarch" for service at Grove Place Farm in Manchester. This horse was a successful sire at Lord Lonsdale's stud farm in England and should improve both the size and stamina of our local thoroughbreds.

Agricultural Education.—A Committee appointed at the instance of the Legislative Council enquired into the Government Farm School and has made a useful report on which action is being taken, so as to improve the efficiency and scope of this Institution. The enlarged accommodation, which now suffices

for 60 students in residence, was fully occupied during the year and there is a good demand for admission whenever vacancies occur in the Institution.

Horticulture.—Improvements have been made at Hope Gardens and in laying out the Old Parade Gardens as "Seymour Place" in the city of Kingston. The display of orchids at Hope Gardens attracted a steady stream of visitors during the year. A large octagonal glass house with aquarium tanks for tropical fishes is now under construction by the Public Works Department which should add to the attraction of the Hope Gardens.

The orchid collection has been greatly increased. Improved technique has been developed in culture, propagation of varieties and the raising of new seedlings. Living plants of hybrids of the local "Broughtonia sanguinea" with a Laelio-Cattleya are now growing. This tri-generic hybrid is new and it is hoped may be of horticultural interest.

The new Bougainvilleas "Evelyn Jelf" and "Lady Stubbs" have been much admired and should soon be widespread in the gardens of Jamaica.

II.—PUBLIC GARDENS.

Report of the Superintendent and Horticulturist.

1. Hope Gardens.

Rose Garden.—The Rose Garden which had been in existence for nearly 30 years was closed down and made into a lawn. Situated on the main drive through the Gardens, the Rose Garden was seldom an attractive sight to look upon as a floral feature because of the constant demand for cut blooms which the Department undertakes to supply to the Public. The new Rose Garden is now situated behind the Pergola of Brick-Red Bougainvillea on the main drive. This site was selected because it can be easily irrigated. The nursery grew the plants from cuttings obtained from the old Rose Garden for planting out the new site and 5,000 plants were used for this purpose. This greatly affected our nursery sales as these plants if sold would have reaslised £125 and our total Nursery Sales, with this amount added, would have been approximately £817 instead of £692 as shown in the financial statement at the end of the Gardens' Report.

Orchids.—Additions have been made to our collection by importation and successful propagation by division of the back pseudobulbs. Valuable hybrids of Cattleyas and Brassocattleyas of high merit were obtained from the Ashlands collection (The late Richard Ashworth) and from Messrs. Sanders, England; also 200 Cattleya labiata from A. Ommundsen, Brazil, and a collection of Vandas, Phalaenopsis and Dendrobiums from the Philippines; while 237 plants were obtained from successful propagation by division of the back pseudobulbs.

As mentioned in the previous report choice specimens of hybrids have been cross-fertilized and an effort made to raise seed on prepared media has been successful, and seedlings are now growing of the following crosses:—

1. Bc. Digbyano-gigas x Lc. lustrissima
2. Bc. Digbyano-labiata x C. Schroederae
3. C. Digbyana x C. Hardyana
4. Bc. Digbyano-Mendelii x C. H. S. Leon
5. Bc. Mrs. J. Leeman x Lc. Empire
6. Lc. Hon. Mrs. Astor x Broughtonia sanguinea.

Successful crosses have been obtained with Barassocattleya and Cattleya on to C. Dowiana.

It was observed during the summer months that the Divi-divi avenue was too exposed a site for the hybrid Orchids and in consequence of this a more suitable site was found in the New Nursery under the shade of two large Guango trees (Pithecolobium saman) and a great improvement has been made in the vigour of the Orchids and the general appearance of the collection is now satisfactory.

Bougainvillea.—The Brick-red Bougainvillea which covered the Pergola near the main drive through the Gardens was cut back to within four feet from the ground to allow for the reconstruction of the Pergola which was badly in need of repairs. The Bougainvillea has made very good growth and has again covered over the Pergola.

Seven seedlings were obtained by crossing the Ruby Bougainvillea with Bougainvillea 'Rosa Catalina.'

Ferns.—A collection of new and attractive varieties of Adiantum, etc., and of Dracaenas was obtained from J. E. Smith, London. They should be of additional interest in the Plant House.

Borders.—The shrubbery by the Director's residence was cleared of miscellaneous shrubs, cultivated and planted with a collection of Hibiscus which included several seedlings from Hawaii among which have appeared some of good merit. The Border on the southern side of the main lawns was completely overhauled and planted with groups of flowering shrubs. The trees along the boundary fence were cut back to allow for the full development of the majestic specimens of Talipot Palm (*Corypha umbraculifera*) growing in the border.

Palms.—Several of the tall unsightly palms growing along the main drive were dug out, and in their place young plants of *Cocos flexuosa* and *Caryota urens* were planted.

General.—The nursery has had to be extended along the central avenue to the Gardens to provide more space for the raising of Citrus and Coffee Seedlings and Timber Seedlings. The severe drought which occurred during the first seven months of the year was responsible for the loss of several thousands of Citrus and Timber Seedlings. Owing to the prolonged drought the Coffee Seedlings received such a check in growth that they were not sufficiently grown for distribution during the Fall of the year.

In spite of the drought, however, a total of 45,198 Timber seedlings were distributed during the year. Of these 14,284 were distributed by the Forestry Department.

The old Potting Shed was demolished and a new Potting Shed with Storerooms at each end was erected in the nursery. The Foreman's Office was removed to a more convenient site and a thirty-day Ansonia clock was purchased and placed over the door.

PLANTS DISTRIBUTED FROM HOPE GARDENS, 1929.

Sold.

Economic Plants:—	
Coffee	50,581
Cacao	313
Citrus—Seedlings	13,225
Citrus—Budded Plants	968
Mango—Grafted Plants	676
Miscellaneous	4,396
	70,159
Ornamental Plants	27,169
	97,328

Free Grants.

Economic Plants:—	
Coffee	..
Cacao	..
Citrus—Seedlings	..
Cane Tops and Cuttings	144,087
Elephant Grass Cuttings	20,640
Timber Trees	45,198
Miscellaneous	114
	210,039
Ornamental Plants	3,678
	213,717
Total Number of Economic Plants	280,198
Total Number of Ornamental Plants	30,847
Total Number of Plants Distributed	311,045

The following statement shows the distribution of plants for the last three years from the Nursery at Hope:—

	1929.	1928.	1927.
Coffee	50,581	41,973	58,908
Cacao	313	1,985	853
Citrus—Seedlings	13,225	44,096	44,472
Citrus—Budded Plants	968	1,276	...
Mango—Grafted Plants	676	721	*
Nutmeg	*	*	203
Eucalyptus	*	*	37
Cane Tops and Cuttings	144,087	206,633	191,960
Elephant Grass Cuttings	20,640	13,304	17,300
Timber Trees	45,198	2,229	10,431
Miscellaneous Fruit and Economic Plants	4,510	2,893	
Ornamental Plants	30,847	30,160	27,074
	311,045	345,270	351,238

* Included in Miscellaneous Fruit and Economic Plants.

2. CASTLETON GARDENS.

A large clump of the Giant Bamboo growing near the Palmetum flowered but, unfortunately, only one seedling was obtained from a large quantity of the seed that was sown. The young seedling has been planted with the other varieties of bamboo near the river. The old plants died after flowering and were dug out. There has been a noticeable improvement in the condition of the plants growing near by since the bamboos causing dense shade have been removed.

Several of the old plants in the Rose Garden died and many of the unsightly old ones were dug out and the spaces were filled in with 200 Maman Cochet.

The Mangosteen trees (*Garcinia mangostana*) in the Gardens produced an abundance of fruit and some of the young trees fruited for the first time this year. Every year a number of seedlings are planted on the hill side to the west of the Garden.

The old stands for pot plants have been removed and the site laid out as a fernery. The fernery by the bathing huts has been extended and planted with native ferns, etc.

During the year the Public Works Department carried through a very necessary improvement at the main entrance to the lower garden by constructing a retaining wall to allow for the widening of the road at this point. In the past, during the tourist season, it was difficult to find parking space for the large number of cars conveying tourists to the Gardens and the widening of this part of the road has considerably relieved the congestion of traffic.

The Gardens, with the added attraction of river-bathing, etc., are becoming more popular each year and are visited on Sundays and holidays by many picnic parties from different parts of the Island.

The usual routine work of billing lawns, pruning shrubs, opening flood drains, forking and weeding beds and propagating plants for nursery sale were regularly attended to.

PLANTS DISTRIBUTED FROM CASTLETON GARDENS, 1929.

Sold.	
Economic Plants	444
Ornamental Plants	994
	1,438
Transferred to Hope.	
Economic Plants	1,151
Ornamental Plants	18,040
	19,191
Total Number of Economic Plants	1,595
Total Number of Ornamental Plants	19,034
Total Number of Plants Distributed	20,629

3. PUBLIC GARDENS, KINGSTON.

During 1928, Law 17 of 1928 was made to allow the Kingston and St. Andrew Corporation to construct a roadway through the Victoria Park to connect up Upper and Lower King Street. This roadway was declared open by His Excellency the Governor, Sir Reginald Edward Stubbs, G.C.M.G., on the evening of January 31st, 1929. The road was named "Seymour Place" after the Mayor of Kingston, the Hon. George Seymour-Seymour, M.L.C., who was responsible for the road being made through this Garden. The Gardens on both sides of the road were laid out to conform with the new road. New lawns were laid out, four long beds running parallel with the road and several other beds were prepared in which varieties of Canna are planted and these make a pleasing display of bloom with their varied colours. To allow for these improvements several unsightly and uninteresting trees were dug out. *Cassia siamea* trees were planted on both sides of the road and these, in time, will provide shade for pedestrians as well as make a very pleasing avenue. Four plants of *Poinciana regia* were planted at the north and south entrances to Seymour Place. Plants of *Cassia grandis* and *Cassia nodosa* were planted on the lawns on the east and west sides of the Gardens.

Pathways were defined and railed off to conform with the new road and a number of the main pathways were also railed off with iron rods. These iron rails have proved very successful in keeping the public from disfiguring the sides of the lawns and as funds allow these rails will be placed along all the pathways.

Five Japanese Fantail Goldfish were put in the Central Tank.

The Kiosk near the Bandstand in the Gardens was removed by the Kingston and St. Andrew Corporation as it was of no further use.

The Jamaica Military Band rendered very enjoyable Band Concerts at regular intervals throughout the year.

The general routine of maintaining the Kingston Gardens, the lawns around the Public Buildings, the Memorial Square, the old Treasury Site and Headquarter House Gardens was regularly attended to.

4. HILL GARDENS, CINCHONA.

An extra grant of £100 was voted by the Legislative Council for clearing the plantation pathways, and for opening up parts of the Garden which had become overgrown with bush from the time when the Department's Headquarters was removed from Cinchona to Hope Gardens in 1897.

The plantation pathways leading to Monkey Hill, and to the old Tea plantation near Sir John's Peak and the pathway leading to the Spring were cleared and are now maintained in good order.

General repairs were done to boundary fences, many of which had to be renewed and gates were repaired and painted. Two of the old established lawns which were in ruinate were cleared.

A large number of Rose plants of Maman Cochet taken from the old Rose Garden at Hope were planted in the border around the lower lawn. The plants were fairly old, but owing to the congenial climate at Cinchona they have developed excellent growth from the old wood.

The collection of Gladioli flowered freely during the months of July and August.

Large quantities of Peat and Moss were gathered from the woodlands to supply the public and the nursery at Hope.

There was a big demand for Xmas Trees at Xmas-time and these were supplied from the woodlands where the Pinus and Cupressus have now become naturalised, and are being used for this purpose.

There were a fair number of visits paid to the Gardens during the year both by people from abroad and those in the Island.

The usual routine work was regularly attended to and the Gardens kept in a tidy condition.

5. King's House Gardens.

Owing to the very dry condition usually prevailing in the neighbourhood of King's House Gardens, it was decided to do away with the shrubberies bordering the main drive from the Hope Road entrance. As a result of frequent periods of dry weather and the insufficient supply of water during the dry period the borders had become very depleted of shrubs and the general appearance was very seldom satisfactory. The borders were cleared of shrubs and made into lawns, and trees of *Poinciana regia* will be planted on both sides of the road to form an avenue. These trees should make an attractive entrance to King's House when they reach the flowering stage.

Six plants of Bougainvillea Lady Stubbs were planted in the enclosure near the entrance to the Dining Hall.

A small tank of irregular outline was constructed under a grouping of trees in the fernery. The surroundings were set out with plants to harmonise with the layout of the tank, and this is a very pleasing addition to the Gardens.

The border of miscellaneous shrubs by the lawn near the Dining Hall was cleared and planted with Bougainvilleas Lady Wilson and Ruby.

Several bare patches which appeared on the lawns were dug up and replanted with Bahama grass.

The ornamental iron fencing enclosing the Gardens from the main drive were removed thus affording an open and more Park-like appearance to the grounds.

The walk under the Bougainvillea Pergola leading from the house to the Lily Tank was laid down with tiles.

The pastures surrounding King's House were cleared of under bush during the year. Several old unsightly Logwood trees (*Haematoxylon campechianum*) in the mule pasture were dug out. Repairs to the fences surrounding the pastures were attended to.

The general routine work of mowing lawns, weeding and pruning shrubberries and House decorations were regularly attended to by the Garden Staff.

6. Gordon Town Garden.

The small enclosed Garden at Gordon Town was maintained in good condition. The boundary fences were repaired and a new gate was put up at the entrance.

7. Bath Garden and Nursery (St. Thomas).

Mr. R. Glen Campbell, Inspector of Plant Diseases, who is in charge of the Garden reports as follows:—

A Citrus Nursery was started last year, and over 2,000 Sour Orange seedlings were planted out for budding but owing to the heavy rains experienced in this district budding has not been a success and a Coffee Nursery will again be started to replace the Citrus Nursery. Three hundred and fifty coffee plants remaining over from last year's lot of seedlings were sold.

Some old trees which had died were dug out and Tree Ferns and Palms planted.

Several of the pathways through the Garden were remodelled and fine gravel from the river near by was used for putting over the surface.

The rectangular bed of various shrubs which had become old and unsightly were dug out and made into lawn.

There was a large number of visitors to the Gardens during the year. Baron Olivier visited the Gardens while on a tour to the Sugar Estates in St. Thomas.

The usual routine work was carried out and the Garden kept in a tidy condition.

8. Summary of Plants Distributed by the Department during the last three Years.

	1929.	1928.	1927.
Coffee	50,931	41,973	59,858
Cacao	313	1,985	853
Citrus—Seedlings	13,225	44,096	46,022
Citrus—Budded Plants	968	1,276	...
Mango—Grafted Plants	676	721	*
Nutmeg	*	*	203
Eucalyptus	*	*	37
Cane Tops and Cuttings	144,087	206,633	195,175
Elephant Grass Cuttings	20,640	13,304	17,300
Timber Trees	45,198	2,229	10,812
Miscellaneous Fruit and Economic Plants	4,954	2,991	
Ornamental Plants	31,841	31,072	28,061
	312,833	346,280	360,321

9. The Garden and Plantation Sales for the last three years have been as follows:—

	£ s. d.
1929	692 17 7
1928	780 10 0
1927	828 6 10

* Included in Misc. Fruit and Economic Plants.

10. The Rainfall at the various Gardens for the year under review is as follows:—

1929.	Hope Gardens	Castleton Gardens	Public Gardens, Kingston.	Hill Gardens, Cinchona.	King's House Gardens.
January ..	1.32	3.94	0.43	3.13	1.00
February ..	2.13	3.24	0.46	2.13	1.00
March ...	0.91	5.19	0.98	4.31	0.80
April ...	3.10	4.59	0.13	2.14	0.80
May ...	2.38	7.15	0.73	3.50	1.95
June ...	0.36	1.18	0.49	1.44	0.00
July ...	1.18	2.21	0.84	1.52	0.60
August ..	4.65	12.12	6.05	5.68	3.15
September ..	4.26	12.26	3.45	8.36	4.15
October ..	9.31	6.87	6.48	5.17	6.20
November ...	1.56	7.62	1.84	4.45	0.55
December ...	0.88	8.10	1.38	5.62	2.20
	32.04	74.47	23.26	47.45	22.40

The following Table shows the Rainfall at the various Gardens for the past ten years (1920-1929).

Year.	Hope Gardens.	Castleton Gardens.	Public Gardens, Kingston.	Hill Gardens, Cinchona.	King's House Gardens.
	Ins.	Ins.	Ins.	Ins.	Ins.
1920 ...	26.24	88.07	9.11	41.17	20.98
1921 ...	63.72	151.23	22.63	112.98	57.03
1922 ...	26.81	86.09	6.87	44.77	22.94
1923 ...	38.10	100.93	21.11	67.60	25.83
1924 ...	71.53	119.02	43.95	90.55	51.39
1925 ...	41.74	101.18	16.64	62.56	30.72
1926 ...	45.84	118.63	17.45	76.57	31.18
1927 ...	61.65	152.21	27.02	108.85	38.26
1928 ..	45.92	107.42	35.49	85.28	29.85
1929 ...	32.04	74.47	23.26	47.45	22.40
Average for 10 years	45.36	109.93	22.35	73.78	33 06

11. Contributions to the Gardens have been received from the following:

Foreign.

East African Agricultural Research Station, Amani, Tanganyika.
U. S. Department of Agriculture.
R. Salques, Brignoles Botanic Station, Brignole, France.
M. J. Rivero, Cai, Colombia.
Department of Agriculture, Trinidad.
Director of Agriculture, Northern Circle, Mandalay.

Local.

W. Cradwick, Mandeville.
Mrs. Maurice Malcolm, Knockalva, Ramble.
Alec. Gordon, Drax Hall, St. Ann's Bay.
F. N. Isaacs, Immigration Office, Kingston.
Chas. Costa, Orange Valley, Brown's Town.
A. Pullar, Kingston.
Dr. G. Machado, Kingston.
Lady Swettenham, Belle Vue, Gordon Town.

M. S. Goodman,
Superintendent of Public Gardens.
E. Downes,
Horticulturist.

III.—AGRICULTURAL EXPERIMENTS.

Report of the Acting Superintendent of Agriculture.

The year under review will long remain in the minds of the sugar-cane planters as one of drought and low prices for their sugars. Although the drought has been a severe one it is anticipated that the average tons per acre obtained in all the districts for the crop that is now being reaped, will be higher than that of the previous year which was a record on previous years. This is chiefly due to the better methods of cultivation now in practice, and the extension of the better varieties of seedling canes. Owing to the low prices of sugar during the past three or four years, planters are turning their attention where possible to banana cultivation, and the area under bananas is steadily increasing year after year. This is particularly noticeable in the Vere district, which is one of the best sugar-cane growing areas in the Island. Wells are being sunk in this district to provide a better water supply for the irrigation and growing of bananas and a sufficient supply is being obtained both from the Vere Pumping Station at Salt River, and from wells to

grow over 3,000 acres of bananas. Owing to such a large acreage of sugar-cane lands going into bananas, the total output of sugar will be materially reduced. In St. Thomas where a large and up-to-date sugar factory, worked by electricity, was erected about four years ago, it has been found more profitable to grow bananas than sugar-cane at the present price of sugar, and the proprietors are also turning their attention to growing bananas on a small scale with the hope that better prices will be obtained for sugar in the future, when these lands will be put back into sugar-cane. In Trelawny where the soil is not suitable for growing bananas, neither is the rainfall sufficient, the estates can only carry on through the good prices which they receive for their special rum.

Mosaic.—Mosaic Disease is being steadily fought year after year, by systematic rogueing and planting of highly resistant varieties but apparently in some years, the climatic conditions favour the sudden outbreak of this disease when it is thought that the disease is under control. This is most noticeable in districts where there is a good rainfall, and planters are afraid to plant extensively any good variety which is susceptible to the disease, although it would double their tonnage per acre, owing to the cost of continual rogueing and replanting and never having their fields well established.

In Westmoreland, the planters endeavour to do all their planting during the Fall of the year, as they have discovered that canes planted at this time of the year do not develop the disease to any extent, while those planted during the Spring develop anything between 20 % and 30 % disease. This was very noticeable on one estate, where two fields of B.H. 10(12) were planted side by side, one in October, and the other in April. In the field planted in October, it was hard to find a diseased cane, while the other had an infection of about 40 %. The ratoons growing from canes which are reaped during the Spring, are always heavily infected, although the past crop on the field had little or no infection, and every succeeding ratoon crop is more heavily infected. This would suggest that the carrier of the Mosaic Disease virus is either dormant during the Fall of the year, or that it is passing through some stage in its metamorphosis which hinders its being an active insector. On one of my visits to St. James and Hanover, several stools of canes were pointed out which had Mosaic Disease, but had recovered from it. Some stools were marked in various degrees of infection and on my next visit, these were examined and some of the stools had no sign of Mosaic while others remained the same.

The P.O.J. 2725 which is highly resistant to Mosaic Disease, has been a most valuable asset in this respect, in that where heavy infection prevails, it has been possible to replant the fields or areas with this variety, and so reduce the area of actually infected cane on the estate. This cane is now being used in infected areas in preference to the Uba as it is much easier to handle, and costs less to cut.

Again this year there has been a marked increase in root disease, particularly in the variety B.H. 10(12) and in most cases this was due to lack of proper drainage and unsuitable soil conditions.

Canes.—The B.H. 10(12) and Ba. 11569, continue to give good results, and some places have averaged over 45 tons per acre for plant canes. In Vere the Ba. 11569 in several instances has exceeded 60 tons per acre. This is a remarkable increase over the White Transparent, which seldom gave 30 tons per acre as its highest tonnage, and it is regrettable to see from statistics gathered during the year, that out of a total of approximately 27,000 acres under canes, the White Transparent claims 7,339 acres, or approximately one-quarter of the area under canes, while the B.H. 10(12) cover 7,633 acres and Uba 6,644. Both the Ba. 11569 and B.H. 10(12) are being gradually extended where conditions are suitable and the P.O.J. 2725 is gradually taking the place of the Uba. The S.C. 12/4 is very promising, and it is being rapidly extended; some places expect to reap over 60 tons per acre from this cane this season, while others have already obtained 55 tons per acre.

The E.K. 28 is a very promising cane in the Vere district. This cane has averaged 78 tons per acre from a field recently reaped. From observation it is apparent that this cane in the Vere district is not very susceptible to Mosaic Disease, while in other districts it is badly affected.

It is very noticeable that on those estates where mechanical cultivation is in practice a much better tonnage per acre is obtained than on estates where mechanical cultivation is not used, the practice of mechanical cultivation not being possible in some places owing to the conformation of the land.

Manurial Experiments.—Manurial experiments were laid out on several estates, but these were rendered useless, owing to the prevalence of Mosaic Disease which in some instances caused the partial replanting of some of the plots and also to other causes. At Riley in Hanover, it will be seen from the results of the manurial plots, how impossible it is to carry out any experiments with any degree of success where Mosaic infection is high. We have included some of the experiments to show how the results have been affected, and it would have been interesting if we could have shown the percentage of infection of each plot, but no record was kept. It was estimated at Riley that the whole field in which the experiment was carried out had about 25 % to 30 % infection. Other manurial experiments were laid out at Morelands, Vere; Cambridge, Trelawny; and Llandovery, St. Ann; but these have not yet been reaped.

Below is a comparison of the analyses of some of the seedling canes which has just been made at one of the factories. These tests were made during December, when it must be expected that the juices would not be at their best.

Variety.	Brix.	Sucrose.	Purity.	Extraction.	Beaumé.
S. C. 12/4 ...	16.50	14.58	88.36	65.05	9.3
P.O.J. 2379 ...	16.70	14.17	84.84	67.74	9.4
P.O.J. 2725 ...	16.30	13.98	85.76	68.70	9.4
P.O.J. 2727 ...	17.10	14.90	87.60	65.92	9.7
B.268 ...	17.20	14.97	87.32	67.82	9.71
B. 295 ...	17.40	15.42	88.62	69.87	9.8
Mexican Striped ...	15.20	13.02	85.65	73.05	8.55
E.K. 28 ...	18.20	15.71	86.31	70.30	10.3
Badila ...	19.60	17.66	90.10	74.50	11.1

M. S. Goodman,
Acting Superintendent of Agriculture.

No. I.

Estate—Cambridge. *Field—Reid Piece, Ratoons.*

Plot.	Description.	Per Acre. Sulphate of Ammonia.	Nitrate of Soda.	Ammo-Phos.	Super Phos.	Sulphate of Po ash.	Cost.	Tons Cane.	Increase. or Decrease.
		cwt.	cwt.	cwt.	cwt.	cwt.			
1	Control	..	..	..	..	..	..	20.00	..
2	Nitrogen	2	..	..	..	..	30/-	25.50	+4.25
3	do.	..	..	2	..	..	33/-	23.35	+2.10
4	Control	..	..	..	..	..	..	22.50	..
5	Nitrogen	..	2	..	..	..	34/6	22.50	−0.75
6	Nitrogen and Potash ..	2	..	..	..	1	44/9	23.75	+0.25
7	Control	..	..	..	..	..	..	24.00	..
8	Nitrogen and Potash ..	..	2	..	..	1	49/3	21.37	−2.50
9	Complete	2	..	..	3	1	64/3	21.00	−2.87
10	Control	..	..	..	..	..	..	23.75	..
11	Nitrogen and Potash ..	3	..	..	..	2	75/6	22.00	+1.13
12	do.	..	3	..	..	2	81/3	20.62	−0.25
13	Control	..	..	..	..	..	..	18.00	..
14	Double Phosphates ..	..	..	..	6	..	39/-	24.12	+6.12

No. II.

Estate—Riley. *Field—Trash House, Plant Canes.*

Plot.	Description.	Per Acre. Sulphate of Ammonia.	Nitrate of Soda.	Ammo-Phos.	Nitrolim.	Sulphate of Potash.	Super Phos.	Cost.	Tons Cane.	Increase. or Decrease.
		cwt.	cwt.	cwt.	cwt.	cwt.	cwt.			
1	Nitrogen ..	..	..	2	..	..	..	33/2	17.41	+2.23
2	Control ..	..	..	..	..	..	..	..	15.18	..
3	Nitrogen ..	..	..	..	2	..	..	20/-	12.14	−3.04
4	do. ..	..	2	..	..	..	..	34/6	20.93	−4.42
5	Control ..	..	..	..	..	..	..	..	25.35	..
6	Nitrogen ..	2	..	..	..	..	..	30/-	12.85	−12.50
7	Nitrogen (double) ..	4	..	..	..	..	..	60/-	18.57	−0.31
8	Control ..	..	..	..	..	..	..	..	18.88	..
9	Complete ..	2	..	..	..	½	2	50/4	15.09	−3.79
10	do. (double) ..	4	..	..	..	1	4	100/9	13.84	−0.44
11	Control ..	..	..	..	..	..	..	..	14.28	..
12	Potash ..	..	..	..	..	2	..	29/6	15.04	+0.36
13	Phosphates ..	..	..	..	..	..	4	26/-	17.68	+2.01
14	Control ..	..	..	..	..	..	..	..	15.67	..

Experiment Station.

Report of the Plant Breeder.

Canes.—The year under review was an exceptionally dry one at Hope. During the first seven months of the year only 11.38 inches of rain was recorded and during this period little water was available for irrigation and the canes suffered badly. The total rainfall for the year was 32.04 inches, as against an average of 45.36 inches for the past ten years, 1920-1929 inclusive.

During the year a total of 144,087 tops and cuttings of various varieties of sugar-cane were distributed thus making a total of 3,581,932 tops and cuttings distributed free to both the large and small cane farmers for the past ten years, 1920-1929 inclusive. Again this year there was a demand for Uba cuttings by the small farmers and 44,374 cuttings were distributed. The P.O.J. 2725 and P.O.J. 2727, were in big demand and 51,353 and 15,774 cuttings, respectively, were distributed.

The following is a list of the varieties and quantities of each distributed:—

P.O.J. 2725	51,353
Uba	44,374
P.O.J. 2727	15,774
B.H. 10(12)	12,172
B. 417	3,855
Ba. 11569	3,797
S.C. 12/4	3,324
H. 109	1,870
P.O.J. 2714	1,800
White Transparent	1,525
B. 1529	1,384
E.K. 28	862
P.O.J. 213	800
C. 553	562
Mexican Striped	217
Badila	206
B.268	200
J. 72	12
Total	144,087

With regard to P.O.J. 2725, to which we drew attention last year, as being a very free-arrowing variety, we again want to emphasize this point and to advise planters that it is not advisable to plant this variety during April and May, as it will arrow during October, the same year, and the tonnage obtained will be very small and disappointing owing to the canes being only about six months old when it commences to arrow. This variety should be planted in the latter part of ugust or early September, when it will pass through the arrowing period of that year without flowering and will have had about thirteen or fourteen months growth before arrowing the following year.

This cane is very suitable for estates in districts where reaping has to be started in December, as owing to its early and very profuse arrowing it ripens early and thus affords a good cane with a fairly good purity of juice to start crop with giving the other varieties which do not mature early an opportunity to mature, and thus better results will be obtained in the factory from having a variety already matured to start crop with. Under these conditions this variety will also give better results as ratoons as this cane will have about ten months growth and will again afford an early start for the factory with a cane of good purity. This cane is not so well suited for districts where cropping commences late for the reasons stated above. In Jamaica this cane has been found to be very highly resistant to Mosaic Disease, and the small cane farmers who are averse to roguein out the disease, have been strongly advised to propagate this var ety and applications are coming in almost daily from them for cuttings. It is hoped that with this variety established in the small cane farmers districts, the prevalence of Mosaic Disease will be reduced almost to n l.

The P.O.J. 2727 is a very promising variety but, unfortunately, its resistance to Mosaic Disease is not so pronounced as in the above variety. It was remarkable during the early part of the year when the drought was very severe to see how this variety persisted in going ahead while the other varieties were at a standstill and some dying out for want of water. Not enough of this variety has been reaped to give any details of tonnage as most of the cane has been used for replanting where it promises to do well.

This cane is not an early maturer like the above and should not be confused with it as regards early maturing. Although neither the P.O.J. 2725 or P.O.J. 2727 have been reaped on a large scale on any estate, the general opinion from general appearances in the field is that the P.O.J. 2727 will give a much larger tonnage.

The P.O.J. 2714 has shown up so well on some estates, particularly those in the rainy districts, that all the canes were cut for replanting. It also promises to ratoon well. In areas where the rainfall is low, this variety is not so promising.

The P.O.J. 213 and P.O.J. 234 are failures wherever they have been tried, and they also have a high infection of Mosaic Disease. They apparently are not suitable to conditions existing in Jamaica.

The B.H. 10(12) continues to give good results when planted on rich loam soil with an adequate supply of water. It will be a long time before a cane can be obtained that will give better results, both in the field and factory, than this variety. Its cultivation is being extended wherever it can be but, unfortunately this cane is sometimes very heavily infected with Mosaic Disease.

H. 109 is very promising only where light soil and an adequate water supply are obtainable, but it will never be a general purpose cane for Jamaica.

S.C. 12/4 has so far given some very good results, and it is being rapidly extended. Records of over 50 tons per acre have been obtained from this cane on estates which started reaping in December, and the purity of juice at this early period has been at one factory 88.57. From observations on estates in the different districts this variety is apparently suitable for growing in either light or heavy clay soils.

The following varieties were imported during the year:—P.O.J. 2878, (which has given such wonderful results in Java), Co. 281, Co. 213, S.M. (San Manuel) 131, S.M. 133 and S.M. 134. We hope to be able to distribute small quantities of cuttings of these varieties during the Fall of 1930.

Some of the fields in the experiment station have been ploughed and replanted with the newer and better varieties and those which are most in demand. It is to be regretted that during prolonged droughts, when water is most needed for irrigation, our supply is limited to only an hour or two per day. If a regular supply of water could be obtained during the drought, larger areas of the better varieties could be planted out, so that planters could be supplied with larger quantities of cuttings for their nurseries and thus be able to extend their cultivation of any suitable variety more quickly than is done at present.

Bananas.—The trees planted out in 1928, have nearly all fruited and have been cross-pollinated for the purpose of obtaining seed. They were again affected by the prolonged drought but with a limited supply of water, and proper cultural methods, they resisted the adverse conditions, and have produced good bunches of fruit. The old section was replanted in October and November, with the following varieties:—Robusta, White House, Rubra, Ram Kelat, Apple and Cavendish.

Trapping for borers was continued throughout the year, and the numbers found have been gradually diminishing.

Citrus.—Spraying with lime sulphur wash against the attacks of the Citrus Black Fly, was continued during the year. Owing to the prolonged drought it was found necessary to put into practice dust mulching throughout the Grove, and this benefited the plants and helped to keep them alive. A fair crop of fruits was reaped. The Grove supplied several thousand buds of Marsh Seedless and Royal Grapefruit and Navel Orange used in budding plants for sale.

Coffee.—The long top section which had been in existence for a very long time was dug out, and the plot ploughed and cross-ploughed. Young seedlings were planted out in October, and these are doing well. The short top section gave a good crop, and withstood the drought well owing to the large amount of shade available and a heavy mulch put on during the drought.

Cacao.—The usual pruning was carried out by the students as well as harvesting, fermenting and curing of the beans. Several demonstrations were made respecting the treatment of Canker and Die-back.

Mangoes.—The method of cutting back old trees of the common mango and budding with the Bombay, was continued during the year. The crop, though not very large, extended over a period from May to September. The demand for fruit both for local use and for export was far in excess of the supply, and this fruit now appears to have a very bright future. There has been a big demand for the grafted plants throughout the year.

Pines.—The pinery consists of three varieties, viz., China, Red Ripley and Red Spanish. The first-named has been a success as a variety for local consumption, and thousands of plants have been distributed throughout the Island during the past five years. The second is a more delicate variety, and requires a richer soil than the China to produce fruit of a decent size. It is a good fruit for export as it carries well and is also in demand by the local market. The Red Spanish is purchased in the local market only when the other varieties cannot be obtained. It is, however, very hardy and is the best shipping pine of the three varieties.

School Garden.—The students continued to grow vegetables comprising cabbage, tomatoes, cauliflower, cassava, (sweet and bitter), turnips, carrots, beet and Irish potatoes. An experiment in varietal tests of tomatoes is being carried out in connection with the following varieties:—Earliana, Gulf State, June Pink, Marglobe and Ponderosa.

Agricultural Education.—The Farm School students continued to visit the experiment station for five days each week, and received instructions in nursery work as well as in the cultivation of all the crops above-mentioned. Special attention was given to the budding and grafting of mangoes and the budding of citrus plants. They have done practical work in forking, pruning, mulching, draining, ploughing, preparing and applying fungicides and insecticides, etc.

Mr. L. A. Powell, the master in charge of the students in practical agriculture, has taken a keen interest in this part of his work.

M. S. Goodman,
Plant Breeder.

IV.—DISEASES OF ANIMALS.

Report of Government Veterinary Surgeon.

Introductory Remarks.—1. The south central portion of the Island in particular suffered severely, between January and August from drought, which caused considerable mortality among cattle in many places and great hardships on owners in their efforts to provide their stock with food and water. The parishes of St. Andrew, St. Catherine, Clarendon, Manchester and St. Elizabeth were in general most seriously affected by these adverse conditions.

As disease frequently accompanies famine conditions, it is remarkable how free from outbreaks of acute infectious animal diseases the year has been.

2. No recurrences of Foot and Mouth Disease have occurred since the end of July, 1926, and no definitely established outbreaks of Anthrax had to be dealt with officially by the department during the year. The few suspected occurrences of the latter disease when investigated all proved negative for the infection.

No extensive outbreak of Tick Fever among cattle has been reported. The instances receiving attention during the year were of a sporadic nature and consisted of losses or sickness of a very limited number of of animals in a few herds.

Blackleg (a non-notifiable disease under the Law) continues to recur annually, especially in the mountainous parts of the Island. It is not possible to gauge its incidence for it is not usually reported officially. Further, stockmen generally are so well acquainted with its nature and its control by vaccination methods, that they seldom call upon the Department for assistance in its suppression.

Epizootic lymphangitis (Saccharomyces farciminosus, so-called "farcy") of horses, mules and asses still exists to a very considerable extent. The worst centres of infection are on sugar estates and other (places) where large numbers of mules are kept in close association in feeding pens or paddocks. As the infection is readily spread by flies feeding on chafes and other wounds as well as by the interchange of harness, infected whips of drivers, etc., its spread in a group tends to be rapid and difficult of control. This is the most serious disease of mane stock, especially mules on the plantations of the Island. Being a chronic type of infection, it does not generally cause the death of affected animals, but by reason of the extensive lesions it produces, especially on the legs, it materially lessens the draught value of affected subjects, and in many cases incapacitates them for work for long periods of time.

3. All reports of suspected outbreaks of animal diseases notifiable under Law 29 of 1922, have been promptly investigated and as far as possible assistance in such cases for their diagnosis, suppression or prevention has been rendered.

Veterinary assistance has also been given in the importation, landing and acclimatization of foreign animals imported for breeding purposes departmentally as well as by private individuals.

When requested, the Department has conducted tuberculin tests for owners desiring knowledge of the condition of their herd with respect to tuberculosis. It is hoped that in future more applications for such survey of herds may be received, so that it may be possible to determine the prevalence of the disease in the cattle of the Island and formulate a plan for its suppression.

1. Government Farm School, Hope.

As in previous years, instruction in Veterinary Science to the three classes of students at the School on a schedule of three periods of two hours each weekly, has been continued. In addition to lectures, cases requiring veterinary treatment at the Farm are always used, if possible, for practical demonstrations of diagnosis, treatment or other methods of examination.

Most of the students show a keen interest in this branch of their work, cheerfully assist in the care of sick animal, and in nursing imported bulls in particular during their attacks of fever have rendered invaluable service.

2. Government Stock Farm, Hope.

Tick Fever.—(i) Constant efforts are maintained at the Farm to limit tick infestation of the pastures and farm grounds and to keep the cattle free of ticks by regular dipping. As in other parts of the Island, where similar practice is in vogue, the result is only partially successful, because the cattle kept under tick control conditions occasionally break out or gain access to near by tick infested premises or ticky cattle from outside stray into the clear or relatively clear pastures, etc., and infest or re-infest such places by dropping ticks.

In spite of the precautions existing at Hope, all imported cattle from the tick-free countries of the temperate zone (all recent importations on the Farm have been from the U.S.A.), soon or late after their arrival contract Tick Fever. If they live through one or two attacks they generally become immune to the effects of the parasite of the disease, unless they are subject to gross or continued heavy infection.

(ii) Importations of Bulls in 1929:—

Breed.	Name.	Attacks of Fever.	Outcome.
1. Red Poll	"Leona's True Lad"	Four successive attacks	Recovered.
2. Red Poll	"Marham Ted"	Two successive attacks	Died.
3. Holstein-Friesian	"North Star Fayne Romeo"	Two successive attacks	Died
4. Jersey	"Sophie 19th's Victor 63rd"	None during year	
5. Guernsey	"Foremost Monogram"	None during year.	

As in the past all cases developing Tick Fever are treated promptly after its onset with Trypan Blue intravenous injections, and in most instances such treatment effects a cure within ten days unless serious complications develop.

In the cases of "Marham Ted" and "Fayne" in which death occurred during their second attack of fever, their demise is assignable directly to the complications appearing during the course of the fever, namely, acute hepatitis and gastro-intestinal catarrh with mild pneumonia in Marham Ted's case and broncho-pneumonia with acute carditis in the case of "Fayne."

(iii) In addition to the acute attacks of Tick Fever seen in imported animals after arrival and less frequently in some of the native born, several of the cattle at the Farm were treated during the year with small doses of Trypan Blue, as a check to the effect of low type of tick fever associated with lack of thriftiness and normal growth. Sixty-seven injections for this purpose were given during the year.

Tuberculosis of Cattle.—Annual tuberculin testing of *all* the cattle at the Farm has been continued with the aim of eradicating the disease from the herd.

In 1927 three intradermal tests of the 350 cattle over four months of age during the months of January, July and November, resulted in the detection of 22 cases of affected animals or approximately 6.15 per cent.

In 1928 a single general test of the herd then numbering 297 discovered only one infected animal—a bull early after his arrival at the Farm. Result 0.37% infection.

In 1929 the general annual test (October 1st-12th) supplemented by four other tests—two before and two after that date of cattle arriving on the Farm before or after the annual test—discovered *one* affected heifer, Red Poll, "Dot," an animal which had given inconclusive result to the annual test of 1928.

Summary of the year.—Cattle tested—once or more—and including all the cattle on the Farm except four calves a few days old—342 head.

Number of re-actors—1 head, Red Poll heifer, "Dot."
Percentage of affected animals.—0.29% approx.

Parturition Record of Cattle.—Eighty-one normal births, two still births and eight abortions.

Of eighty-one calves born, six died or were destroyed, one died from blackleg when about 4 months old two died from umbilical infection, three were destroyed because of congenital weakness.

Blackleg.—Annual vaccination against this infection was instituted at the Farm in 1927 as a precautionary measure, not so much against possible latent infection on the Farm, where no case of the disease had occurred since its establishment in 1910, but to ensure the safety of young stock when sold or moved into infected parts of the Island.

On May 9th, 1929, however, a young unvaccinated heifer, Cadenza born in January (previous herd vaccination was done in October 1928) developed the disease and died.

Promptly all cattle on the Farm under three years of age were vaccinated and no further losses ensued.

Number vaccinated 113 head.

Miscellaneous diseases.—Under this category there have been during the year:

(i) Nine more or less serious puncture wounds of the hoofs in two mules and seven cattle.
(ii) Three cases of abscessation of the withers or back in mules.
(iii) One case of actinomycosis in cattle.
(iv) Twelve cases of retention of foetal membranes.
(v) One case of incurable eczema in cattle.
(vi) One case of eversion of the uterus in a cow.
(vii) Fracture of leg in one bull.
(viii) Fatal umbilical infection in two calves.
(ix) Acute enteritis following indigestion in one dairy cow.
(x) One case of chronic diarrhoea in a heifer.

Farm Poultry.—Tuberculosis among the poultry was discovered on January 21st, 1929, when a dead rooster was submitted for post mortem examination. Lesions of the infection were found in the spleen liver and intestinal wall and the nature of the infection confirmed by laboratory examination.

This being the first case found in the flock steps were taken to detect by tuberculin tests the extent of infection in the flock.

Three intradermal tests of the birds were made during the year (May 29th, August 13th, September 30th) with following result:—

Of the 7 cocks and 41 hens in the flock on May 29th, one cock and 10 hens reacted positively to the tests conducted and two other hens being decidedly under-weight were also condemned. The flock has thus been reduced for this cause by 1 cock and 12 hens. All 13 birds at autopsy exhibited tuberculosis lesions.

2. Vaccination against fowl cholera.

Annual vaccination against this disease which in the past has occurred in the flock was carried out on the 5 cocks and 33 hens composing the flock on August 14th, 1929.

3. Two hens died during the year, one from impaction of the crop and gizzard with dried vegetable matter, the other from peritonitis caused by rupture of egg sac intra-abdominally.

3. Grove Place Stud Farm.

(i) Seven visits for general inspection and other purposes were made during the year.

(ii) Mane Stock

(a) After the sale of Throughbred stallion, "Lembach," early in the year, his place at the stud was taken by Thoroughbred stallion, "Royal Highness," secured in England through the kind assistance of Lord Lonsdale.

He was landed on July 19th, taken to Hope Farm and kept there for nearly a month before his transfer to Grove Place on August 17th. Since his arrival he has been in good health.

(b) Brood mares. 1. Three mares, namely, Princess, Bachelor Maid, Water Witch, born 1914, 1909, 1911 respectively, having proved non-breeders for two or more years and being of considerable age, were destroyed as unprofitable.

2. Mange among the mares (psoroptic mange locally termed hair lice) has been effectively controlled by systematic treatment with Little's Perfect Fluid Dip and Arsenite of Soda in a strong solution of Paranaph water.

(c) Imported jack, "Kentucky Boy," still suffers from keraphyllocele (granulation tumor of horn) in the toe of both front hoofs. This condition has been periodically treated, but persists as a nonpainful affection of his front hoofs.

(d) Gelding, "Pirate," has been chronically lame for many months, from infection of the plantar cushion resulting from a deep wire or stone cut of the inner quarter of the off fore-foot. Operative treatment temporarily ameliorated the condition but has not effected a satisfactory cure.

(iii) Cattle.

(a) The health of the cattle has been generally good throughout the year. Dipping for tick control has been regularly done. The annual vaccination against blackleg, an infection which has appeared more than once in the past, was carried out as usual for protective purposes and with good results. No cases of the disease were reported during the year.

(b) No general tuberculin test was made, as the herd proved free of that disease in the test of 1926. One animal, Angus Indian bull, "Duke of Clarence," however, was tested on May 5th, as he developed a chronic cough after an attack of pneumonia and general upset a few days after being dipped. Result of the test was negative. This bull has not fully recovered since his attack of pneumonia, as it left him with a form of chronic respiratory trouble.

(c) Deaths from disease:—

Two still births, two calves born deformed and killed, two calves from dysentery and one heifer from a gangrenous leg.

(d) Imported Brown Swiss bull, "Trumpeter" at the stud since April, 1920, and 15 years of age being no longer potent was ordered destroyed. He was born March 1, 1914.

4. Work and Assistance in the Country Parts of the Island.

Fifty-one official visits to places in the country other than Grove Place were made during the year as follows:—Thirteen for investigation of rumoured or reported occurrences of anthrax, two for suspected foot and mouth disease, three for tuberculin tests, five for general inspection of cattle, three for diagnosis of obscure blackleg, ten for tick fever in native and imported cattle, two each for bloody diarrhoea of heifers and calves, two for fluke infestation of cattle and sheep, one visit each in connection with arsenical poisoning of cattle, intestinal parasites in a flock of goats, infectious sores of the tail in young mules, lung worms in cattle, castration of lambs, udder trouble, sterility, milk fever, suspected malicious killing of cattle and suspected foulbrood of bees.

(i) Anthrax.

Representations have frequently been made to the Jamaica Agricultural Society and the Department of a seasonal prevalence of anthrax in some districts of St. Elizabeth.

In previous years when reports of mortality, especially of cattle, were received from these parts, prompt investigation was made, but in no instance was I able to establish anthrax in connection with such reports. In two instances the infection was clearly blackleg, in one tetanus and in most of the others the indications were plant poisoning (probably urichites, so-called nightshade).

Three of these districts (Rose Hall, Malvern and Santa Cruz) were again visited during the year because of rumours or direct reports. In no case was anthrax found.

Conversation with some owners who have suffered considerable losses in past or recent years tends to confirm my opinion that much of the mortality of stock is traceable to plant poisoning (most probably urichites, so-called nightshade). In all the districts visited this plant of known poisonous qualities grows abundantly and rankly in the pastures and elsewhere.

Of the six properties (two in St. Ann, three in St. Elizabeth, one in Hanover) reporting mortality of cattle suggestive of anthrax, post mortem study with the assistance of laboratory examination failed to establish anthrax infection. In two of these instances autopsy showed lesions very similar to those exhibited by anthrax carcases, but bacteriologic examination proved negative.

(ii) Foot and Mouth Disease.

Two reports of suspicion of this disease were received and immediately looked into thoroughly.

The first in Hanover was suspected merely on the exhibition of sickness of a cow with excessive drooling of saliva. On arrival the subject being dead was examined post mortem. No lesions of the mouth or feet were found. Death apparently was caused from impaction of the third stomach. No other cattle on the property showed at the time or subsequently any indications of foot and mouth infection.

The second along the Spanish Town Road near Halfway Tree was clearly ulceration of the mouth from the spines of cactus the cow had been eating. Several of the sores showed these thorns imbedded.

(iii) Tick Fever.

Three pens have reported losses among their native-born cattle from acute tick fever. The numerical loss in these cases has not been high, but some valuable breeding males and females were lost.

Assistance in these outbreaks as well as in the acclimatization of bulls imported by private owners, has been rendered by the Department.

(iv) Tuberculosis.

At the request of owners the Department tested two groups of cattle during the year, numbering 461 and 5 head respectively.

Result.	Group No. 1	461 tested	12 reactors.
	Group No. 2	5 tested	1 reactor, a previously tested herd showing infection.

(v) Hog Cholera or Swine Fever.

Only one report of "hog sick" was received, namely from Agricultural Instructor Wates on October 5th. The locality, Moore Town, experienced considerable mortality of swine in 1925-26. Being on sick leave I did not investigate the matter. In view of its occurrence in the protracted rains of that area at the close of the year, I am inclined to think the trouble probably was the annual appearance of fatal pneumonia of swine, which study in the past has shown in most cases to be not hog cholera or swine fever (a highly infectious disease with fatal results). In most cases such outbreaks decline rapidly in incidence when the weather improves.

(vi) *Blackleg.*—Stockmen generally are well informed regarding the nature and diagnosis of this disease, and when it occurs do not notify the Department (it is not a notifiable disease). They have had experience in its prevention by vaccination. Consequently the Department has not been called upon to any extent in this matter.

On one Estate, however, assistance was rendered in establishing a diagnosis in view of the apparent failure of the vaccine used to effectively immunize the treated stock and to account for the recurrence of the disease in calves vaccinated 6-9 months before the re-appearance of the disease.

(vii) *Epizootic lymphangitis* (*Saccharamyces farciminosus*).—This so-called "farcy" is very prevalent on many of the plantations of the Island. It affects horses, mules and donkeys, but mules are most commonly affected.

Tentative treatment by intravenous injections of biniodide of mercury solution has been instituted on a small number of mules. These injections to 81 mules on three estates are reported by their veterinarian (Dr. V. H. Delfosse) to be of marked benefit in all types of cases, i.e., in long established as well as incipient cases. Its value, however, cannot at present be fully judged and further work on its merits in the field is necessary.

5. Tick Eradication and Control.

1. No systematic inspection of cattle or tanks was conducted during the year. Judging, however, from the amount of Paranaph and Arsenite of Soda sold from the Government Laboratory to owners of registered dipping tanks, it is evident that dipping is being maintained on many pens.

	1927.	1928.	1929.
Sales of Paranaph ..	29,954	37,353	37,849lbs.
Sales of Sodium Arsenite	17,475	21,900	21,725lbs.

2. Number of registered tanks:—

1928.	1929.	Increase.
305	329	24

3. Prosecutions under the Law. One with conviction.

6. Assistance in Education.

Lectures at:—
(i) Agricultural Instructors Annual Conference at Hope in January.
(ii) Six lectures to Sanitary Inspectors at School on February.

7. Inspection of Animals for Export and Landing in Island.

For export:—
Eleven bulls to Cuba, May 18th.
One jack to Belize, British Honduras, August 13th.
Six mules to Belize, British Honduras, November 28th.
One bull to Colombia S. A. August 11th.

For Landing in Island:—
Eight pure-bred bulls—3 Red Polls, 1 Hereford, 2 Holstein, 1 Jersey, 1 South Devon—Seven from U.S.A., one from England.
Four stallions and two fillies (Thoro-bred)—all from England.
Two Saanen goats from U.S.A.
Fifty one dogs—all from England.
Four cats—all from England.

8. The Protection from Diseases (Bees) Law, 1918.

No recurrence of American Foulbrood has happened during the year.
One suspected apiary on the Old Hope Road, St. Andrew, was promptly reported by its owner, but examination did not show any grounds for his report.

S. Lockett, V.M.D.,
Government Veterinary Surgeon.
14.2.30.

V.—PLANT DISEASES AND PESTS.

Report of the Secretary of the Advisory Committee on the Banana Industry.

The membership during 1929 was:— Hon. J. H. McPhail, Hon. T. J. Cawley, F. A. Cory, Esq.; J. Roy Johnson, Esq.; G. J. Goble, Esq.; P. Lindo, Esq.; The Secretary, Jamaica Agricultural Society, Director of Agriculture (Chairman), the Supervising Inspector and the Microbiologist (Secretary).

Mr. L. L. Carrington was appointed to the Committee on his appointment as Secretary of the Jamaica Agricultural Society. The Entomologist acted as Secretary during the absence of the Microbiologist on leave.

No meetings were held during the year as it was found possible to deal with all matters by means of circulated papers. Sixty-two of these papers were dealt with during the year. The weekly and monthly reports and summaries were circulated as hitherto.

The large scale experiments on Panama Disease treatment initiated at the instance of the Committee by the Microbiologist in 1928 were continued with the kind collaboration of Mr. Johnson of the Atlantic Fruit Co. and his staff. While the Microbiologist was on leave the Director of Agriculture made a report to the Committee on these experiments giving his views of the situation up to date.

The official records of the incidence of Panama Disease during the year 1929 are:—

Annual Totals for Parishes.

Portland.	Diseased Plants.	New Cases.	Recurrences.	Total Cases.
Rio Grande ...	22,055	93	15,441	15,534
Swift River ...	7,290	20	4,731	4,751
Daniels River ...	3,059	2	1,745	1,747
Mabess River ...	930	101	356	457
Buff Bay River ...	2,413	182	1,117	1,299
Spanish River ...	3,101	25	1,729	1,754
Manchioneal ...	2,079	27	877	904
Port Antonio ...	9,925	162	5,775	5,937
Total for Portland	50,852	612	31,771	32,383

	Diseased Plants.	New Cases.	Recurrences.	Total Cases.
St. Mary ..	21,630	902	12,480	13,382
St. Thomas ..	3,627	367	1,586	1,953
St. Ann ..	1,896	198	931	1,129
Trelawny ..	253	53	58	111
St. James ..	4,178	231	986	1,217
St. Catherine ..	1,844	258	934	1,192
Hanover ..	594	19	219	238
Clarendon ..	1,911	308	705	1,013
Manchester ..	71	18	12	30
Westmoreland ..	602	54	302	356
St. Elizabeth ..	20	3	1	4
St. Andrew ..	35	6	10	16
Total for year ..	87,513	3,029	49,995	53,024
Year 1927 ..	40,137	2,332	17,867	20,199
Year 1928 ..	54,109	2,644	27,231	29,875
Total 1912-1929, (Dec. 31st)	235,144	13,340	115,920	129,260

MONTHLY TOTALS.

	Diseased Plants.	New Cases.	Recurrences.	Total Cases.
January ...	7,082	324	3,989	4,313
February ...	6,811	320	3,755	4,075
March ...	5,654	189	3,549	3,738
April ..	8,752	243	5,697	5,940
May	7,346	333	3,464	4,797
June ..	7,201	283	4,123	4,406
July ...	6,981	229	4,215	4,444
August ...	5,983	174	3,871	4,045
September ...	5,975	216	3,397	3,613
October ..	8,589	232	4,860	5,092
November ...	7,983	202	4,279	4,481
December ...	9,156	284	4,796	5,080
Total for year ...	87,513	3,029	49,995	53,024

F. E. V, SMITH,
Secretary,
7.2.30.

FIELD EXPERIENCES WITH PANAMA DISEASE OF BANANAS, 1912-1930.

It is considered that a summary of the experiences of the Department in the control of Panama Disease in Jamaica since its first discovery at the beginning of 1912 will prove useful to banana planters at the present juncture and serve to show the practical basis upon which the present system of control is operated under the Order prescribing the treatment of Panama Disease for the purposes of The Protection from Disease (Plants) Law. The two officers who have prepared this summary, viz., the Director of Agriculture and the Supervising Inspector of Plant Diseases (Mr. J. B. Sutherland) have been working together continuously during the past 18 years in directing the work of control of Panama Disease in Jamaica and we are therefore personally familiar with all the facts.

For reasons of island policy and the preservation of the credit of individual holdings some measure of reserve has consistently been exercised by the Department in publishing facts about Panama Disease.

While generalisations and the full statistics of the incidence of the disease have been regularly published in our Departmental Reports, we have been careful to avoid references to particular properties or individuals. The planters, both great and small, have hitherto for the most part obeyed the Law and accepted the sacrifice involved in the quarantine of Panama Disease for their own and the general good. During the past year, however, public opinion was a good deal unsettled by the opinions pronounced by Dr. Wardlaw, the newly appointed Plant Pathologist of the Trinidad Tropical College of Agriculture, which were put forward at a meeting of planters in Kingston and again repeated in a publication of the Empire Marketing Board on Panama Disease of Bananas.

As these opinions were not in accord with all the experience of the control of Panama Disease in Jamaica during the past 18 years, it became necessary, for the protection of our chief industry, to check them by actual experiments, the results of which are described herein. These show that Dr. Wardlaw had entirely misconceived the nature of Panama Disease, its relationship to the Gros Michel Banana and to the soil, while he had failed to recognise that the methods by which the disease is most directly spread in the field is by chain-action from plant to plant through root contacts, thus involving a system of quarantine and the elimination of "contacts" as against "in situ" treatment as recommended by him.

PANAMA DISEASE EXPERIMENT.

PANAMA DISEASE EXPERIMENT.

Origin of Disease.

The earliest observed case of Panama Disease in Jamaica is believed to have been on a hill-side in the Rio Grande Valley in Portland just before the great hurricane of 1903. It is now recognised that sporadic cases of Panama Disease had long been treated in this Valley as "Water-soak" before the Department became aware of the presence of this dangerous disease.

The first case definitely diagnosed as Panama Disease occurred in January, 1912, in the Buff Bay Valley in Portland. At that time the causative organism was unknown, the Department had no Mycologist and diagnosis had to be made by planters familiar with the lesions of Panama Disease in Central America.

Shortly after, cases were discovered in the village of Claremont in St. Ann behind the chief shop of this place and a third site was found in the Williamsfield district of Hanover. There is no reason to connect these three foci of disease at the East, Central and Western end of the island, and it is reasonable to believe that they were distinct and separate foci of infection probably brought about by the bringing of tools or infected planting material by labourers returning from the diseased areas of Central America. The Government had done its best to prevent such introduction of infected materials by strict prohibitions but it is believed that a few cutlasses and banana suckers were nevertheless smuggled through the Customs in personal baggage or clothing. For example, the Hanover case is believed to have originated from a sucker of the Robusta Banana which was smuggled in by a returning labourer from a diseased field in Central America and planted in his cultivation in that parish. The disease first started among the Jamaica bananas at the point where this Robusta sucker was first planted. A similar case was subsequently discovered in the Wag Water Valley in St. Mary.

Methods of Treatment.

When the Department was called upon to treat the first recognised case of Panama Disease at Balcarres in Portland in January, 1912, it was clear to the Director from the appearances in the affected plots that the disease was of a fungoid nature starting in the root system and gradually invading the upper portions of the banana plant.

The treatment suggested from these field observations was that of quarantine by the removal of all "contact" plants. The maximum distance of spread of banana roots required a quarantine distance of one chain for complete security as to contacts and this distance was therefore adopted as the scale for field operations of quarantine for the disease. The economic loss under this method is 4 square chains of healthy bananas for the quarantine of one diseased root. Experience, however, has fully supported this practice in all cases of new foci of disease. Where a less area has been quarantined the recurrences have been more frequent. In many cases this original drastic treatment has prevented further spread of the disease for a long period of years. As the disease gets more prevalent in any locality, economic considerations force a reduced standard of treatment and this is gradually reduced to "half-chain" and finally to the "9 root system" of 16 feet radius by which the eight healthy plants surrounding any diseased plant are destroyed in each case for the area of quarantine.

With such reduction of the quarantine area, our experience has been that the incidence of the disease has increased and its rate of spread becomes more rapid. On the other hand, the reduced treatment is an immediate economic advantage. The present and future have therefore to be balanced one against the other. Experience in the field has shown that control by Departmental inspection becomes impossible, on any lower scale than the "9 root system" because of the very large number of recurrences which soon become beyond control of the inspecting officers. The Governor in Privy Council, on the basis of many years experience, has laid down the following rules for the guidance of the Department in enforcing quarantine for bananas infected with Panama Disease:

Approved Treatment of Panama Disease under Law 10 of 1925.

1. For the first three cases on any property or equivalent association of small holdings the full treatment under the order (4 square chains) is to be enforced.
2. After the third case one square chain only to be treated for the fourth and fifth cases.
3. After the fifth case one-half of one square chain to be treated.
4. Thereafter on the approval of the Director of Agriculture having been obtained, the treatment can be reduced to the minimum of "9 roots" i.e., 8 healthy roots surrounding the diseased plant.

Experiences of "in Situ" Treatment.

In dealing with Panama Disease many people have been led to consider that the treatment of the diseased plant only was the best line of defence. Reasons in favour of one-root treatment are obvious. A saving of crop, of land, of cost of treatment and the avoidance of disturbing the infected soil.

Many hundreds of planters in Jamaica both great and small have during the past 18 years, given this idea extensive practical trials on their own cultivations. The results have been invariably disastrous. Owing to the chain-action by which the disease rapidly spreads in the soil from plant to plant, the one-root system has invariably led to a serious and catastrophic spread of the disease so that a relatively large area of land may be lost within a year or 18 months after the discovery of the first case. It is our opinion that the adoption of "one-root" treatment in attempts to hide Panama Disease has resulted in the status of this disease in Jamaica being at least ten times what it would otherwise have been. It is to this practice of foolish cultivators that is due the failure of large areas of banana lands in the parishes of Portland and St. Mary which is now in evidence.

Some Field Experiences.

In 1912 an experiment was conducted with a view to destroying the fungus in the soil and so rendering the area again fit for banana cultivation. A plot was fenced with barbed wire 6" apart to ten feet in height.

The soil was properly double forked and trenched. Two barrels of lime were applied to the sq. chain. Suckers were taken from a district 12 miles off free of Panama Disease. A catch crop of Overlook Beans was planted. Banana plants began to die at three months and all plants died off within six months. A catch crop of corn was planted and an excellent crop of corn was in sight. The crop of corn was reaped by the praedial thief although a padlocked gate and ten strands of wire were used for the isolation. Bananas have been planted on this area three times since and have died from the effects of Panama Disease. This gives proof that the fungus exists in the soil indefinitely.

Planter No. 1 saw a big banana plant about one chain from a stream showing symptom of disease. He had a big mango tree growing nearby. He made a coal kiln of the mango tree over the diseased root and extracted over 18 bags of coal from the kiln. He replanted the spot with a healthy banana sucker. This plant grew vigorously for about six months when the planter invited the Inspector to see how Panama Disease had killed the tree. Needless to say his opinion was emphatic: "You can't kill this thing because it's the second time it has appeared at this spot and even burning cannot get rid of it."

Planter No. 2. Panama Disease appeared in his fine field of plants. He got all the ashes from his kitchen and surrounded the diseased hole. Another plant died and he surrounded all the trees standing with another supply of ashes. The third plant died and the Inspector by accident found out the spot. The field was so badly inoculated by the carrying of ashes and digging without disinfectants that the life of this promising field was less than eighteen months.

Planter No. 3 was very keen on taking all precautions on disinfectants and fencing but implored leave for an experiment to be carried out without digging out the healthy roots. The full area was fenced off. He was warned of the grave risk to his surrounding field. The first diseased plant was burnt down to the ground with about two cords of wood. About one month after the adjacent plant showed symptoms. This plant was cut low to the ground and gasolene was poured over the earth and bulb and ignited. Another adjoining plant showed symptoms and Carbon bisulphide was used. Many plants died and were treated with lime and fire until within a year the disease appeared outside the area and the experiment was stopped and the complete area destroyed. After five years this field has become a thoroughly inoculated area that will never again grow the Gros Michel.

Planter No. 4. Three diseased plants were found in an 8 acre piece. In each case the diseased plant and its adjoining plants were dug up and burnt completely. The small area was thoroughly limed and fenced. Shortly after two plants adjacent to the fence were found to be diseased and were similarly treated. Suddenly the disease became virulent and eventually the whole 8 acres had to be abandoned.

Planter No. 5. Two diseased plants were completely burnt to ashes and labourers and tools disinfected. Within two months three more adjacent plants were found to be infected and treatment was carried out in accordance with the order, the result being that the banana walk is still producing good results.

Planter No. 6. On one estate every diseased plant was taken to a copper and burnt in order to hide the presence of the disease on the property. When discovered by the Department, over two acres had to be destroyed. A healthy sucker was planted in the copper itself and within 6 months the plant died of disease. This is a striking illustration of the resistance of the banana bulb to the action of fire.

Planter No. 7. The diseased plants which were found adjacent to the fence of a previously treated area were thrown into the fenced area. Within three months thirty cases of disease were found in the field.

Planter No. 8. The diseased plants in a two acre piece were treated by burning only the diseased root and fencing around the spot. The second case appearing was treated by burning the diseased plant and the two adjoining healthy ones. The treatment was thus continued on an increased scale until ten healthy plants were treated. Finally the whole field had to be destroyed before the second crop was reaped.

Planter No. 9. All healthy suckers were inoculated by something which was kept a secret. The plants were planted in diseased holes and all died within six months.

Planter No. 10. A two acre piece was planted with healthy suckers. The disease evidently appeared early but the so-called curer began to supply sword suckers claiming that the area needed supplying. The diseased suckers were being dumped into the nearby river. The curer was forced to stop all supplying and leave all dead trees standing. A treatment looking like sulphur and lime was placed around all affected plants. In less than eighteen months the area that only contained four previously infected spots was a standing mass of dried trees, one plant affecting ninety others.

Planter No. 11 cut down forty diseased plants in a field of plants and the complete area of 4 acres had to be wiped out. On the opposite side of the road where the Orders have been obeyed, bananas are still being produced since an infection in 1915.

Planter No. 12. Every plant showing signs of disease in an acre piece was burnt, the excuse being wasps attacking trees. Within one year complete field of plants had over thirty cases and had to be destroyed.

Planter No. 13. Forty acres with a slight infection was planted. Deep trenching and deep forking were carried out; some trenches being 6 feet deep. Every diseased plant appearing was dug out and chopped up and either Robusta or Cavandish planted. The numbers of infected plants soon went from units to tens and within a year reached hundreds. There is now only about ten acres remaining in its third year.

Planter No. 14 planted out healthy suckers in an acre piece. Tile-drained every two rows. Special artificial manures were supplied to one section of plot. The disease wiped out the field before the second crop could be reaped.

A banana field on a very steep slope about three hundred feet above a river was affected with Panama Disease. A land slide occurred causing an embankment of some 20 feet of earth upon another holding below. The owner of holding below planted out the fresh thoroughly mixed earth with healthy banana suckers. Every plant died of Panama Disease within a year after planting. Banana plants put in tubs with sterilized soil have become infected.

The Department planted over sixty plants in a former infected area and all trees died within six months. Planted one plant in a diseased hole in another infected area and plant produced small bunch of six hands which was reaped. The follower of sucker died of disease within three months after the parent tree was cut.

From time to time various people have considered that disturbing the soil around the diseased plant necessitated by the digging, results in the spread of the disease. With the idea of overcoming this objection

the Department experimented with other methods suggested. A number of poisonous chemicals were tried but none was found to work at all satisfactorily and none could be relied on to kill the underground parts of the banana bulb.

Among the chemicals used in these experiments were the following which were administered in large doses to the soil immediately around the root or in holes bored in or under the bulb of the plant. Arsenite of Soda, Arsenite of Lime, Sulphuric Acid, Turpentine, Carbon bisulphide, Corrosive sublimate, Copper sulphate, Benzol, Kerosene oil, Tar, Cooper's Dip, Rock Salt and Gasolene. Carbon bisulphide killed plants on dry sandy soils but failed on loams with moisture. Arsenite of Soda, 4 lbs. to the root, killed on dry soil but failed in the wet Rio Grande soils. One gallon of gasolene poured into four holes bored under the root stuffed with a crocos bag and ignited, failed to kill the growing suckers of the bananas.

A half cord of wood was used to burn one root after being cut down level to the ground. The suckers grew up after six weeks with great vigor and the fungus could be seen on the rotting bulb with the naked eye.

It is interesting to watch how the banana plant gives off an excessive amount of water when a hole is made into the bulb and poison is placed in it.

Special Experiments in 1929.

A special series of experiments were carried out by the Government Microbiologist during the year at the direction of the Director, in order to test certain ideas as to the status of Panama Disease that had recently gained currency and were considered on the basis of Departmental experience to be heresies.

The experiments were designed to test whether poor or rich soil, good or bad drainage, alkaline, neutral or acid soil showed any difference in the capacity of the Fusarium fungus to attack the Jamaica or "Gros Michel" banana. Typical soils were collected from various sites in the island representing:—

(1) Very poor soil
(2) Rich soil
(3) Well-drained soil
(4) Heavy soil
(5) Alkaline soil, (high PH value)
(6) Neutral soil
(7) Acid soil (low PH value.)

The soils were sterilized with high-pressure steam in situ in large concrete vessels. Healthy banana suckers were planted in each case and the seven vessels were inoculated with the organism of Panama Disease. Duplicates of Numbers 5, 6 and 7 were left without inoculation. After five month's growth the results are now in evidence. *All the bananas in the inoculated soils have succumbed to Panama Disease while the check plants without inoculation are growing healthily.*

These results confirm field experiences in Jamaica during the past 18 years that good cultivation, drainage, a high or a low PH value in the soil cannot prevent the onset of the disease when infection is present.

Field experiences in Jamaica and in Central America have shown that cultivation tends to spread the disease.

With regard to the theory that the Fusarium travels through the soil in the absence of the banana plant, thereby rendering quarantine futile, there are plots to be seen to-day on an estate in St. Mary where Panama Disease was treated by the Department 15 years ago, and where healthy bananas still surround the original quarantined areas, showing that in 15 years the Fusarium has not travelled a distance of one chain in the absence of bananas on the soil.

Across the road there is a small holding where "one-root treatment" was secretly carried out by the owner. In this case over forty bananas became infected in less than a year by 'chain action' or the passage of root-infection from one banana plant to its neighbour. In this case the spread of the disease only ceased when it reached the owner's house which proved to be immune to the disease.

These results support the necessity of a quarantine area in the treatment of Panama Disease.

Trial of Re-planting abandoned Lands.

On a property in Portland, 40 acres of land had been abandoned in 1922 as a result of Panama Disease primarily to protect neighbouring areas of healthy cultivation. As an experiment in "one-root treatment" this land was replanted with the Jamaica banana in 1927. The initial infection was less than three per cent. 'One-root treatment" was carried out and each diseased Gros Michel has been replaced by an immune variety.

The results show that in the first two years of the experiment, out of the original 14,400 plants, 9,711 or over *two-thirds* of the whole have developed disease. The land has only borne one-third of a crop and has been commercially unprofitable as a source of "Gros Michel" bananas.

(Sgd.) H. H. Cousins, Director.
J. B. Sutherland,
Supervising Inspector.

Plant Diseases in Jamaica in 1929.

Report of the Government Microbiologist.

From June 20th to Dec. 16th I was on leave in England, attending the Second Imperial Mycological Conference, the Imperial Meteorological Conference, and carrying out certain special investigations in connection with bananas.

During this time the Entomologist with the assistance of Mr. Bent continued the routine work of the Laboratory.

Reports have already been submitted to the Government on these subjects, but I desire once more to point out the value of technical men from the Colonies meeting at these Conferences and exchanging views. The value of getting first hand information concerning diseases and other matters from the men who are dealing with them in other parts of the world cannot be over estimated. I also desire to express appreciation of the valuable services rendered by the Director and Staff of the Imperial Bureau of Mycology, not only in arranging the Conference but for the ready assistance and facilities which they give to Colonial Pathologists.

Bananas.

Panama Disease (*Fusarium cubense E.F. Sm.*).—The rainfall during the year was again on the whole somewhat below the average for the Island in general, and in consequence the actual increase of Panama Disease although very much larger than the year before was proportionally only a little greater.

In the details of the figures for the year which are given in the report of the Secretary of the Advisory Committee on the Banana Industry, it will be seen that the disease has increased considerably in St. Mary and now appeared in every parish with the exception of the parish of Kingston itself.

Many new centres of disease have appeared in the plains of St. Catherine and Vere during the present year. These have been widely scattered over the whole of this irrigated belt though so far the actual spread on the individual properties has not been very great.

Comparative tests of the value of various methods of treatment and size of quarantined areas were initiated on a number of properties in St. Mary in September, 1928.

Several of these experimental areas have been unevenly flooded during the year and this has interfered with the experiment to a considerable extent. In spite of this, however, there is as yet no consistency in the rate of spread under the three trial treatments and no results of significance in favour of any one of the treatments can yet be arrived at.

Bonnygate Disease (*Sphaerostilbe musarum, Ashby*), occurred in certain river valleys but was most severe in the Borobridge area, a district in which the disease has been troublesome since it was first discovered.

A visit was paid to this district and the settlers were lectured on the disease and methods of improved cultivation in addition to the normal disease control were advocated. This valley is very fertile and there is a tendency in consequence to put off replanting too long, with the result that 60 to 70 per cent. infection of Bonnygate Disease is not unusual in some places.

Other Banana Troubles.—A few cases occurred in which peculiar symptoms appeared in irrigated bananas. These were all investigated but there was a lack of evidence of any pathogen in each case.

Sugar Cane.

Mosaic.—The situation with regard to control of this disease is about the same as in the previous year. On a few estates it still gives trouble but on the whole planters manage to keep it well within control.

Root Diseases continue to give trouble in some places, but no outstanding cases occurred during the year.

So far Pokkah-Boeng has not been evident in Jamaica although it is present in the neighbouring island of Cuba.

Gummosis also has not been recorded for this Colony. It is hoped that both these troubles will be prevented from appearing in the Island by the rigorous enforcement of the Plant Import Regulations.

Coconuts.

There have been very few complaints concerning coconut diseases during the year. On two properties where leaf diseases (Pestallozzia and Diplodia) were very conspicuous the attention to drainage and a little cultivation coupled with a general cleaning up of the trees has given very satisfactory results.

Citrus.

The opportunity occurred during my leave in England to inspect numerous consignments of Jamaica grapefruit and oranges arriving in Covent Garden. A special report has been submitted to the Government concerning the nature of the rots appearing in this fruit. On the whole the quantity of rot was extremely small and compared very favourably with fruit arriving from other countries. A most noticeable feature was the rarity of cases of Blue or Green Moulds (*Penicillium italicum* and *P. digitatum*). No doubt the better picking and handling of the fruit consequent upon the enforcement of the Agricultural Produce Laws and Orders has had a large bearing on the control of these diseases.

Diseases of Other Crops.

Mosaic diseases continue to be prevalent in many of the lesser crops and wild plants.

Tobacco mosaic as usual have been common in ratoon crops although it has been definitely shown that careful handling and disinfection of the fingers will reduce the incidence of this trouble very considerably.

Irish potatoes on the whole have shown very little virus diseases in Jamaica but there have been cases of severe infections with Early Blight (*Macrosporium solani*).

Fermentation.

Visits were made to an estate where High Ether Rum manufacture was being initiated and advice given as to the preparation of washes.

There has been no demand whatever for pureculture of yeasts.

Inspections.

Eight inspections of imported seed potatoes have been made for the Agricultural Society and visits to the Docks have also been necessary for various inspections and disinfections of imported implements.

Orchid Raising.

This work has continued with very satisfactory results and many of the seedlings have been planted out and are now in the hands of the Horticulturalist.

Banana Varieties.

The work at Hope has continued to be concentrated upon obtaining difficult crosses which have not been obtained by the ordinary methods of pollination as practiced at the Castleton Station. By means of pregermination of the pollen and by using careful methods of application of this pollen we have succeeded during the year in obtaining seeds of several new crosses and those which in the past have only been obtained with difficulty.

The raising of seedlings has not been particularly successful. It has been found repeatedly that the selfed Gros Michel Seedlings lack vigour in the early stages and usually die off when an inch high. The climate at the Laboratory probably has a bearing on this since at certain times of the year the pots dry out very quickly. In all, sixteen seedlings were raised of these crosses but six of these were lost. On the whole Hope has proved to be a difficult district in which to carry our breeding work. Each year there has been a dearth of material for working upon first of all through long droughts each year, lack of irrigation water and in addition frequent losses of almost mature trees have taken place through wind. The weakening effects of all these factors have resulted in a very slow recovery with poor and slow growth of the replanted sections.

List of Diseases.

A list of the fungus diseases known to exist in Jamaica has been prepared and at present is in the hands of the Director of the Imperial Bureau of Mycology preparatory to its publication in the Kew Bulletin.

F. E. V. Smith,
Government Microbiologist,
January, 1930.

Report on Banana Breeding.

I beg to submit the following report of work carried on by me in connection with Banana Breeding for the year 1929. The method pursued by your orders is as follows:—

Pollination of bananas is carried out on the two breeding plots at Castleton. The seedlings from this Pollination are reared to a height of 10 to 15″, and are then planted in a field at the St. Catherine District Prison Farm where they are cultivated by the prisoners under the supervision of the Superintendent of Prisons.

Castleton.

Owing to the heavy norther of November, 1928, which blew down 90% of the banana plants on the two plots at this station only eleven seedlings were raised which were in due course transferred to Spanish Town. Many seeds were produced but were found unfertile. Pollen is now also being taken from the seedlings at Spanish Town to this station. The reason for this is as follows:—

Some of the seedling varieties which we have so far produced are lacking in length of fingers, size of fruit and size of trunk. Thus by recrossing them on the Gros Michel we hope to get new seedlings that will give the desired qualities nearest to the Gros Michel.

Two methods of Pollination are being employed, one by soaking the pollen in water overnight and spraying the stigmas at different times of the day, and the other by removing the pollen by a pair of forceps and applying it with a brush.

After the norther both sections were replanted with the Gros Michel variety in place of the Robusta.

Varieties of the Lacatan, Giant Fig and Bumelan Bananas obtained from Trinidad and Grenada have been planted out. We hope to use the pollen of these on the Gros Michel.

Through the kindness of Mr. Munn we received from our former energetic Microbiologist, Mr. Hansford whose interest in us is evidently as alive as ever, twelve bulbs of an African Variety of Bananas. Unfortunately these bulbs arrived with defaced labels and in a very poor condition. They were planted at this station and five plants have grown and are doing fairly well. In growth they appear very much like our Robusta.

The No. 5 Seedling, Jamaica X Robusta, which proved not immune to Panama Disease was transplanted from Spanish Town to this station with the object of again pollinating it with the Robusta so as to put in two parts Robusta to one Gros Michel.

St. Catherine District Prison.

The Plot at this station has throughout the year been kept in good cultivation by the Superintendent of Prisons. Owing to the drought, irrigation was restricted and in consequence the progress of the plants was somewhat impeded.

In March, suckers of seedling varieties Nos. 19, 20, 27, 29, 30, 40 and 48 were transferred from this station to the Plot infected with Panama Disease at the Government Laboratory at Hope to test their immunity. All the suckers are growing luxuriantly and have not yet shown any symptoms of Panama Disease.

From April to June most of the seedlings fruited at this station. The only promising ones were the different crosses of the Jamaica-Robusta. The other crosses produced too small bunches, small trees and too short fingers. In one case Robusta-Rubra produced fruit without any flesh inside.

On the suggestion of Messrs. Cawley and Johnson of the Advisory Board all the seedling plants with fruit were cut back and much improvement is now being seen in the fruit produced by the first ratoon.

Plants that fruited six hands have now fruited eight hands. The short fingers have also slightly increased in length. In the case of the Jamaica-Robusta the finger is still about an inch shorter than a well developed Jamaica Banana.

In May last year, suckers of the No. 7 variety (Jamaica Robusta Cross) were transferred from this station to an infected area at Bog Walk. Ordinary Jamaica banana suckers were planted on both sides of the seedlings. In November, two of the Jamaica Banana suckers on the right and left sides of one of the seedlings died of Panama Disease leaving the seedling growing vigorously. Suckers of the most promising of the seedling varieties are now being tested in diseased spots in St. Mary and Portland.

The acquisition of more Jamaica bananas at this station for pollination is very necessary as the pollen could be taken from the seedlings and immediately put on the Jamaica Bananas adjoining them. There are now nine new varieties of bananas produced by our method of Cross Pollination. It is interesting to note that plants produced by the same cross breeding differ materially in growth, colour and fruit.

Government Laboratory.

Here we have a plot thoroughly infected with Panama Disease since 1915. Jamaica Bananas were planted on this plot in 1915, 1922 and 1927. No plant of Jamaica Banana has ever lived long enough to produce a bunch, as they have all yielded to the ravages of Panama Disease within four to six months after planting.

On the 27th April, 1928, suckers of seedling varieties Nos. 4, 5, 6 and 7 were planted in holes from which diseased Jamaica Bananas had been removed. No. 5 died from the disease within seven months. Varieties Nos. 4 and 6 produced fine fingered fruit without seeds. The fruit of No. 4 Ram Kela-Jamaica was very acid in flavour. That of No. 6 has not yet been sampled.

It is interesting and encouraging to note that No. 7 has produced its second bunch containing eight hands. Its first bunch was a six-hand, poor in stem and its fingers were about 4" long. The flavour of the fruit was the same as that of the Jamaica Banana and the fruit was free of seeds. Four suckers of Jamaica Bananas planted around this plant have all died within three months after planting. Four others have again been planted as a further test. Varieties Nos. 19 and 20 transplanted from Spanish Town to this infected area in March, are now flourishing and have yet shown no signs of Panama Disease. At Spanish Town these two varieties have so far produced fruit nearest approaching the Jamaica Banana. The further immunity and quality of the fruit of varieties Nos. 7, 19 and 20 are being watched with keen interest and hopes.

J. B. Sutherland,
Supervising Inspector of Plant Diseases.
20.1.30.

Report of the Entomologist.

I have the honour to submit the following Report on the work done in this office, during the period June to December, 1929, that is, since my arrival in Jamaica.

2. I arrived in the Island and entered upon my duties as Entomologist on the 28th of May.

3. On June 20th, the Microbiologist left the Island on leave and I also took charge of the Microbiological Division, until the 16th December, acting as Government Microbiologist and as Secretary of the Banana Advisory Committee.

4. During the period under review, the following insects have been noticed attacking more or less seriously various crops or other cultivated plants.

Banana.—The Banana Borer, *Cosmopolites sordidus* Germ., was only found doing serious damage in a few plantations where no measures of control had been adopted to combat the pest. In all cases where heavy infestation was observed the state of affairs could be ascribed to lack of proper cultivation; numerous breeding places for the insect being as a rule afforded in fallen plants and in large pieces of cut stems left on the ground.

Where the fields were cleanly cultivated, and especially where the destruction of breeding places had been systematically practised, the degree of infestation was found very slight, and the damages caused by the insect negligible.

Whenever banana plantations were visited, the attention of the owners of properties or of the person in charge was called on the importance, to control the pest in an effective manner, of having recourse to field sanitation.

Experiments with Insecticides.

As the damage caused by Cosmopolites is especially important in new plantations where young suckers are attacked, and rapidly destroyed before they have developed roots, experiments were started:

(*a*) With a view to find a practical method for destroying Cosmopolites inside the tissues of suckers intended for plantations.

Fumigation with Carbon bisulphide and with Hydrocyanic acid gas (under atmospheric pressure and during various lengths of time) of infested suckers did not give satisfactory results.

Submersion of infested suckers, during periods not exceeding two hours, in water containing dissolved HCn., was also ineffective in destroying the larvæ of Cosmopolites in the deeper tissues of the corms.

(*b*) With a view to find a cheap method of poisoning the external parts of bulbs through which young larvæ enter into the corms.

These experiments are in progress, and results not yet available.

Natural Enemies of the Borer.

Searches were made in the fields where the consignments of *Plaesius javanus* imported from Java were liberated during the years 1918-19, but no specimen of the Histerid was found.

Sugar Cane.—The Sugar Cane Looper cutworm *Mocis repanda* was reported from one estate.

The Sugar Cane Moth Borer, *Diatrea saccharalis* F. and the white grub *Lachnosterna jamaicensis* Arrow were not found causing serious damage on any of the estates visited.

Corn.—Severe outbreaks of the Corn Ear Worm, *Chloridea absoleta* F. and of the Fall Army Worm, *Laphygma frugiperda* S. and A., occurred during the months of September and October in the districts of St. Elizabeth where especially young plantations suffered very heavily. Advice was given to the Agricultural Instructor of the district and to several planters of the locality. A special report was submitted in which was explained the conditions which affect outbreaks of these insects in those regions, recommendations were also made of measures that could be adopted in future for the destruction of these pests.

Tobacco.—A very serious outbreak of the tobacco leaf miner *Phthorimeae operculella* occurred on an estate in the parish of St. Thomas.

The stringent measures of control which were immediately applied resulted in the plantations being rapidly freed from the pest and new seedlings being raised for new plantations.

During the outbreak the percentage of parasitised larvæ remained low. Measures have been taken to breed and liberate the parasites of the pest in that locality.

Coffee.—The Hemispherical scale, *Saissetia hemispherica* was very prevalent in certain districts of St. Thomas, Port Royal Mountains and Manchester.

Specimens of branches attacked by the stem Borers, *Amphicerus terebrans* and *Derancistrus lineatus* were received from districts of Clarendon.

Citrus.—In the regions visited the trees were found heavily infested with scale insects and with the Black Fly *Aleurocanthus woglumii*, Ashby. As a rule very little was found being done to control these pests. Measures have been taken to start experiments and to make demonstrations to planters of fumigation under tents with Calcium Cyanide.

Pastures.—Caterpillars of *Laphygma frugiperda* of *Mocis repanda* and of *Mocis punctularis* were common in grass lands, the damage done by these insects being more severe in the drier parts of the Island.

Mango.—The Red Banded Thrips, *Heliothrips rubrocinctus* (Giard), was found seriously infesting several trees in an orchard in St. Andrew.

Papaya.—Defoliation of trees by the Horn Worm *Erinnyis elope* was observed in one case in St. Andrew.

Pumpkins.—A field in the region of Spanish Town, was found completely destroyed by an outbreak of *Margaronia hyalinata*. The pest was destroyed and preventative measures applied in the neighbouring plantations on that Farm.

Cassava.—An infestation with Red Spiders occurred in a field near Spanish Town, advantage of this was taken to make demonstrations of spraying.

In connection with the work in the Microbiological Division, during the Microbiologist's absence, thirty-seven samples of tissues from diseased banana plants were received from Plant Inspectors, and from various planters, the results of identifications made have formed the subjects of separate reports. The raising of new varieties from seeds was continued and seven new seedlings were delivered to the Supervising Inspector of Plant Diseases.

Orchid seeds delivered by the Horticulturist have been successfully grown in the laboratory on artificial media.

Inspections were made on estates and advice given to planters on various fungus and virus diseases of plants.

Examination of Plants.

Inspections of plants and of potato tubers were made in connection with their importation and exportation from the Colony.

Contribution to the Journal of the Agricultural Society.

Various articles dealing with insect pests of minor crops, and explaining to planters the principles of their control, were published in that Journal.

W. H. Edwards,
Government Entomologist.

VI.—AGRICULTURAL EDUCATION.

Report of Headmaster, Farm School.

I have the honour to forward this my annual Report for 1929.

Numbers.—The School was full during the whole year. We had 60 students for each of the three terms.

Students.—The following students completed their prescribed course of three years:—

D. L. Baugh	R. W. Witter	H. A. Tinker	J. W. Webster
D. J. Gooden	W. C. Wynter	H. R. Riley	C. H. Ellis

The demand for reservations continues to be excellent and we should be able to keep the school full during the coming year.

General.—The usual work was carried out in the Class-rooms and the Experiment Station. The continued addition of modern equipment to the Stock Farm has been of great value to the practical work of the students with the stock.

The increase in our numbers has shown that we need another Assistant Master to teach English and Arithmetic. We are no longer able to combine two classes as was possible when the school had only 42 students. The need of the Assistant is emphasized when the Veterinary Surgeon is travelling.

I have the honour to be,
Sir,
Your obedient Servant,
R. S. Martinez,
Headmaster.

Report of Medical Officer.

Halfway Tree,
6th January, 1930.

I have the honour to report that during the year ending December 31st, 1929, the general Health of the students of the Hope Farm School has been very good. When competing in the annual sports, a student accidentally fractured his thigh bone, otherwise only cases of minor illness or injury were dealt with during the period under review.

The students, attendants, and servants, who required it, were inoculated against Enteric Fever.

The Sanitary conditions were good.

I am,
Sir,
Your obedient Servant,
Lewis A. Crooks,
M.B., C.M. (Edin.)

The Director of Science & Agriculture,
Hope Gardens,
Kingston P.O.

VII.—LIVE STOCK.

Government Stud Farm, Grove Place, Manchester.

Live Stock, Grove Place, 1929.

	1	Pedigree Jersey Bull
	1	Native Aberdeen Angus Bull
	1	Pedigree Ayrshire Bull
	2	Grade Montgomery Bulls
	1	Bull Calf of 1928
11—	5	Bull Calves of 1929
	7	Pedigree Cows
12—	5	Pedigree Heifers
74—	74	Native Cows
	5	Grade Native Heifers
	5	Grade Ayrshire Heifers
	8	Grade Brown Swiss Heifers
	1	Grade Devon Heifer
	26	Grade Guernsey Heifers
	4	Grade Hissar Heifers
	21	Grade Jersey Heifers
	6	Grade Red Poll Heifers
77—	1	Grade Montgomery Heifer
5—	5	Steers
179		

Horsekind:—

1	Imported English thoroughbred Stallion "Royal Highness"
1	Imported Proof Ass, "Kentucky Boy"
8	Brood Mares
1	Colt
4	Fillies
1	Gelding
18	Mules
3	Donkeys
37	Head

The following is the Summary of the Valuation of Livestock at Grove Place on March 31st, 1929:—

	£	s.	d.
Cattle	1,307	0	0
Horsekind	560	0	0
Total	1,867	0	0

IMPORTED RED POLL BULL, "LEONA'S TRUE LAD."

DAIRY BUILDING, GOVERNMENT STOCK FARM, HOPE.

SERVICES OF BULLS AT GROVE PLACE, JANUARY 1ST TO DECEMBER 31ST, 1929.

No.	Bulls.	Visiting Cows.	Farm Cows.	Total.
1.	Brown Swiss "Trumpeter"	..	3	3
2.	Jersey "Etta's Pogis"	9	21	30
3.	Native Aberdeen Angus, "Duke of Clarence"	..	1	1
4.	Red Poll "Pilot"	1	..	1
5.	Montgomery-Guernsey "Cortes"	3	11	14
6.	Montgomery Brown Swiss, "Justice"	1	7	8
7.	Ayrshire "Food Controller"	2	..	2
		16	43	59

GOVERNMENT STOCK FARM HOPE.

Live Stock, Hope Stock Farm, 1929.

PEDIGREE STOCK.

Red Polls—			
	Imported Red Poll Bulls	2	
	Native Red Poll Bull Calves	2	
	Imported Red Poll Cows	2	
	Native Red Poll Cows and Heifers	31	37
Jerseys—			
	Imported Jersey Bulls	2	
	Native Jersey Bull and Bull Calves	5	
	Imported Jersey Cow	1	
	Native Jersey Cows and Heifers	28	36
Guernseys—			
	Imported Guernsey Bull	1	
	Native Guernsey Cows and Heifers	4	5
Ayrshires—			
	Native Ayrshire Bull Calves	2	
	Native Ayrshire Heifer	1	3
Brown Swiss—			
	Native Brown Swiss Bull	1	
	Native Brown Swiss Cows and Heifer	6	7
Montgomery—			
	Imported Montgomery Bull	1	1
	Total Pedigree Stock	..	89

GRADED STOCK.

Bulls—			
	Grade Montgomery Bulls and Bull Calves	6	
	Grade Guernsey Bulls and Bull Calves	5	
	Grade Jersey Bull Calves	3	14
Cows—			
	Dairy Cows	129	
	Foster Mothers	11	140
Heifers—			
	Grade Native Heifers	3	
	Grade Ayrshire Heifers	7	
	Grade Guernsey Heifers	37	
	Grade Holstein Heifers	2	
	Grade Jersey Heifers	31	
	Grade Montgomery Heifers	10	
	Grade Nellore Heifer	1	
	Grade Red Poll Heifers	4	95
Steers—			
	Plough Steers	10	10
	Total Graded Stock	..	259
	Grand Total	..	348

Horsekind—

18 18 Mules

Poultry—

1 Pen Rhode Island Reds

Bees—

Nil.

NEWLY IMPORTED SIRES.

Imported Holstein Bull—"North Star Fayne Romeo 484144."

Born: December 23, 1925.
Sire: Sir Romeo Mildred Colantha 414461.
Dam: North Star Fayne Johanna 777863.
Purchased from Carnation Farms, Wisconsin, U.S.A.,
Cost: £336.
Landed February, 1929.

Imported Red Poll Bull—"Leona's True Lad 48186."

Grand Champion International Show, Chicago, 1928.
Born: November 12, 1924.
Sire: True Rebuna 44174.
Dam: Leona Lassie A. R. 44954.
Purchased from Adolph P. Arp, Eldridge, Iowa, U.S.A.
Cost: £254.
Landed February, 1929.

Imported Red Poll Bull—"Marham Ted 17th 50043."

Born: February 16, 1926.
Sire: Ruperta's Teddy A. R. 32696.
Grand Champion, U.S.A.
Landed Jamaica, July, 1925.
Dam: Marham Lassie 17th 51651.
Purchased from Adolph P. Arp, Eldridge, Iowa, U.S.A.
Cost: £132.
Landed July, 1929.

Imported Jersey Bull—"Sophie 19th's Victor 63rd 280301."

Born: August 16, 1927.
Sire: Sophie's 19th's Victor 171891 A.J.C.C.
Realised the highest price ever paid at public auction for an American bred bull. Sire of daughters of Gold and Silver Medals for milk production and butter fat content.
Dam: Sophie's Hopina 445738.
Record: 18,166 lbs. milk; 917 lbs. butterfat; gave the highest milk yield of the daughters of Pogis 99th of Hood Farm 94502.
Purchased from William R. Kenan, Jnr., Lockport, New York.
Cost: £233.
Landed June, 1929.

Imported Guernsey Bull—"Foremost's Monogram 111353."

Winner of several prizes in U.S.A.
Born: November 20, 1924.
Sire: Langwater Foremost 39191 A.R.
Sire of 60 Advanced Registry Daughters. (Sold for £4,000).
Dam: Katonah's Prunella 47879 A.R.
Record: 14,347 lbs. milk; 691 lbs. fat.
Bred by Emmadine Farm, Hopewell Junction, New York, U.S.A.
Cost: £233.
Landed June, 1929.

Imported English Thoroughbred Stallion—"Royal Highness."

Obtained from The Right Honourable Earl of Lonsdale, England, in 1929.
Born: 1918.
Sire: "The Tetrarch" by "Roi Herode."
Dam: "Royal Marriage" by "Pietermaritzburg."
Breeder: A. E. Barton.
Landed July, 1929.

Weekly Analysis of Milk Supplied to the Public Hospital, Lunatic Asylum and General Penitentiary by the Stock Farm, 1929.

Quarter ending.	Solids.	Fat.	Sp. Gravity.	Solids not fat.
March 31, 1929 ..	13.52	4.82	1.0304	8.70
June 30, 1929 ..	13.25	4.59	1.0304	8.66
September 30, 1929 ..	13.64	4.96	1.0302	8.68
December 31, 1929 ..	14.13	5.37	1.0301	8.76
	13.64	4.94	1.0303	8.70

The following is a summary of the Valuation of the Live Stock at the Hope Farm to March 31st, 1929.

	£	s.	d.
Cattle	8,321	0	0
Horsekind	348	0	0
Poultry	50	10	0
Total ..	£8,719	10	0

Milk Yield, Dairy Herd, 1925, 1926, 1927, 1928, 1929.

Imperial Quarts per diem.

Month.	1925.	1926.	1927.	1928.	1929.
January ..	304.9	401.0	433.7	400.1	490.0
February ..	324.0	386.3	392.0	353.1	459.0
March ..	369.3	414.4	407.4	401.6	454.8
April ..	441.9	435.8	459.2	478.3	464.0
May ..	513.7	453.2	503.1	520.6	466.9
June ..	504.1	485.2	444.4	533.0	499.9
July ..	457.9	511.4	476.1	564.1	527.8
August ..	464.0	567.6	489.4	557.5	562.5
September ..	438.4	519.2	456.2	524.7	538.3
October ..	432.9	526.8	396.9	463.0	480.7
November ..	393.1	492.1	424.6	445.7	471.1
December ..	396.7	473.3	429.7	455.4	474.0
	420.1	472.2	442.7	474.7	490.8

Record of Dairy Herd Milk Yield, 1929.

Month.	Av. No. of Cows.	Total Qts. per mensem.	Av. per Cow-Qts.
January	93	15,190.0	5.3
February	91	12,853.4	5.0
March	85	14,098.8	5.3
April	82	13,921.5	5.6
May	80	14,473.1	5.8
June	80	14,996.2	6.2
July	82	16,360.5	6.4
August	81	17,439.2	6.9
September	82	16,149.4	6.6
October	81	14,900.8	5.9
November	82	14,132.3	5.7
December	82	14,694.5	5.8
	83	14,934.1	5.9

MILK YIELD, 1929, HOPE FARM DAIRY HERD.

No.	Name of Cow.	Breed.	Age in years.	Average Content Milk Fat.	Yield in lbs.	Milking Weight.	Max yield Imp. Qts.	Sale Price at 8d. per Qrt. £ s. d.
1	Kara 1st (7 months)	Grade Holstein	9	3.6	8,743	1,264	24.7	112 9 10
2	Lydite 3rd	Grade Holstein	7	3.8	7,698	1,062	17.5	99 0 9
3	Marchioness 12th	Grade Montgomery	7	5.4	7,378	1,052	17.2	94 18 8
4	Beetroot	Holstein Red Poll	10	4.7	7,261	1,050	18.9	93 8 5
5	Bess 1st	Grade Guernsey	9	4.2	7,192	1,040	13.4	92 10 10
6	Monica 6th	Grade Brown Swiss	8	4.3	7,142	1,050	16.5	91 17 9
7	Hope Beta 5th	Red Poll	7	3.7	6,921	960	18.0	89 0 10
8	October	Brown Swiss	8	4.3	6,773	1,026	11.9	87 2 10
9	May 3rd	Grade Guernsey	8	4.2	6,736	1,050	16.0	86 13 5
10	Pet 1st	Grade Zebu Jersey	10	4.6	6,735	1,074	12.4	86 13 2
11	Polka	Red Poll	8	3.9	6,685	1,050	14.8	86 0 1
12	Mystery	Red Poll-Jersey	8	4.7	6,558	1,000	13.2	84 7 9
13	Marchioness 3rd	Grade Ayrshire	4	4.7	6,505	922	11.5	83 13 10
14	Dodo 1st	Grade Holstein	10	3.6	6,437	1,144	19.8	82 16 7
15	Sayda	Jersey	6	5.4	6,427	900	19.3	82 13 9
16	Shrew 13th	Grade Guernsey	7	4.5	6,387	874	12.6	82 3 3
17	Desiree 3rd	Red Poll	8	3.8	6,352	1,110	13.7	81 14 7
18	Blossom 1st	Grade Zebu Jersey	11	4.5	6,326	964	16.4	81 8 0
19	Hope Brisk 1st	Red Poll	10	3.4	6,294	1,090	10.3	80 19 10
20	Mirage 3rd	Grade Jersey	6	5.5	6,265	942	11.9	80 12 2
21	Lydite 13th	Grade Holstein	7	3.9	6,111	992	14.4	78 12 5
22	Portia	Jersey	7	4.9	6,012	920	16.1	77 7 1
23	Norbrook 3rd	Grade Holstein	5	4.1	5,941	1,224	16.0	76 8 11
24	Quail 4th	Grade Brown Swiss	8	3.9	5,867	982	9.8	75 9 4
25	Freda 2nd	Grade Holstein	4	4.0	5,766	582	12.2	74 3 8
26	Hope Betty 5th	Red Poll	5	4.6	5,550	880	16.0	71 8 2
27	May 4th	Grade Jersey	7	5.2	5,528	1,000	15.3	71 2 4
28	Norbrook 4th	"	4	4.7	5,491	1,090	17.1	70 12 9
29	Lydite 2nd	Grade Holstein	8	4.1	5,490	1,166	12.9	70 12 6
30	Pigeon 2nd	Grade Brown Swiss	8	4.3	5,332	1,054	11.9	68 12 0
31	Meadow	Grade Montgomery	6	6.3	5,271	1,190	13.2	67 16 5
32	Dodo 3rd	Grade Holstein	6	4.0	5,221	1,142	6.2	67 3 7
33	Quail 6th	Grade Native	4	4.7	5,112	802	15.2	65 15 6
34	Panama's Betty	Red Poll	7	4.0	5,082	1,194	13.8	65 7 11
35	Lizzie 3rd	Grade Jersey	6	5.0	5,024	936	15.9	64 12 11
36	Monica 7th	Grade Guernsey	7	3.6	5,002	1,030	11.8	64 7 2
37	Pussy 2nd	Grade Red Poll	6	4.0	4,929	1,134	17.4	63 8 1
38	Angel 11th	Grade Holstein	7	4.4	4,892	1,106	14.4	62 18 8
39	Stocking 5th	Grade Jersey	5	4.7	4,887	774	13.6	62 17 4
40	Porosa 2nd	Grade Red Poll	8	3.9	4,867	1,110	11.9	62 12 6
41	Rosette 8th	Grade Guernsey	6	4.4	4,834	910	11.4	62 3 9
42	Pogistine	Jersey	6	6.1	4,828	830	13.5	62 2 6
43	Jimmy's Pansy	Jersey	5	4.7	4,759	744	9.4	61 4 7
44	Lydite 4th	Grade Holstein	6	4.1	4,640	964	9.4	59 13 10
45	Angela	Jersey	4	4.9	4,633	944	14.8	59 12 3
46	Freda 1st	Grade Holstein	9	4.0	4,560	970	11.6	58 13 2
47	Panama's Pretty	Red Poll	10	4.1	4,552	1,234	13.8	58 10 10
48	Dolly 3rd	Grade Jersey	5	4.9	4,449	850	13.3	57 4 8
49	Sola 5th	Grade Zebu Jersey	10	4.1	4,417	1,180	14.0	56 16 6
50	Hood's Ethelstine	Jersey	6	5.0	4,394	950	14.4	56 10 5
51	Badge 6th	Grade Jersey	4	5.3	4,353	870	10.6	56 0 1
52	Tilda 4th	Grade Montgomery	7	5.4	4,340	1,050	11.7	5 16 11
53	Diva 6th	Grade Guernsey	8	5.6	4,226	786	8.2	54 7 6
54	Paste 1st	Grade Jersey	4	4.8	4,192	778	12.7	53 18 5
55	Hood's Mead	Jersey	5	4.8	4,113	1,000	13.6	52 18 2
56	Monica 13th	Grade Guernsey	4	5.5	4,099	1,058	11.3	52 14 8
57	Hope Beta 3rd	Red Poll	9	4.4	4,048	945	9.7	52 1 7
58	Pussy	Grade Red Poll	14	5.0	4,034	1,070	10.8	51 17 10
59	Alicia	Grade Jersey	5	4.2	4,016	934	11 5	51 13 6
60	Monica 8th	Grade Brown Swiss	6	4.0	4,016	860	10.3	51 13 5
61	Red Girl 3rd	Grade Jersey	7	4.3	4,006	890	14.3	51 10 6
62	Diva 15th	Grade Guernsey	4	5.3	3,998	778	8.6	51 8 6
63	Jimmy's Ethelstine	Jersey	4	5.1	3,970	930	12.9	51 1 7
64	Perfume	"	6	5.1	3,960	820	15.5	50 18 8
65	Perilusta	"	4	5.6	3,910	890	15.8	50 6 0
66	Sola 13th	Grade Jersey	6	4.9	3,743	900	8.3	48 3 0
67	Cognac 2nd	Grade Holstein	7	4.0	3,709	942	19.3	47 14 3
68	Shrew 11th	Grade Guernsey	10	4.9	3,608	936	9.1	46 8 3
69	Monica 15th	" "	4	3.8	3,601	845	10.3	46 6 10
70	Baby 5th	Grade Jersey	4	5.5	3,550	800	9.1	45 13 6

INTERIOR FITTINGS, DAIRY BUILDING,
GOVERNMENT STOCK FARM, HOPE.

INTERIOR FITTINGS, DAIRY BUILDINGS,
GOVERNMENT STOCK FARM, HOPE.

Hope Stock Farm, Year 1928-29 ended 31.3.29.

Cash—Appropriation.

Revenue.

	Approved Estimates.	Revised Estimates.	Actual.	
	£	£	£ s. d.	£ s. d.
Balance 31.3.28	755	1,418	1,418 4 1	..
Milk (Sales)	4,400	5,100	5,275 17 3½	..
Butter (Sales	100	36	51 5 0	..
Live Stock (Sales)	300	190	190 1 0	..
Poultry (Sales)	30	32	48 10 1	..
Rents	70	102	105 0 3	..
Rearing Calves for Grove Place	5	15	14 10 0	..
Pasturage (Fees)	50	40	40 0 0	..
Bombay Mangoes (Sales)	350	241	240 17 3	..
Pines (Sales)	150	115	115 16 5	..
Miscellaneous—Interest Bank £49 6 9				
Truck 31 11 0				
Sundries 96 2 5	25	145	177 0 2	..
Jamaica Govt. (In hand for sale of Lembach)	..	..	..	125 0 0
	6,235	7,434	7,677 1 6½	7,677 1 6½
				7,802 1 6½

Expenditure.

		Approved Estimates.	Revised Estimates.	Actual.
	£ s. d.	£	£	£ s. d.
Personal Emoluments—				
Accountant	..	50	50	50 0 0
Clerk	..	40	40	40 0 0
Foreman	..	130	132	131 5 0
Wages	..	800	925	921 17 1
	..	1,020	1,147	1,143 2 1
Other Charges—				
Food for Stock:—				
Growing Canes	14 18 1			
Growing Guinea Corn	61 9 4			
Manufacturing G. C. Silage	129 5 2			
Imported and Other Feeds	1,994 19 8	1,400	2,240	2,200 12 3
Crops: (Pine Plantation 3 acres)	..	300	115	102 14 6
Rearing Calves by Grove Place	..	100	136	151 3 0
Cleaning and Fencing	..	300	448	452 9 9
Buildings, Mchg. and Equipment:—				
Buildings: Repairs and Additions ..	254 3 1			
Machinery, Repairs and Replacements ..	69 1 0			
Furniture and Fixtures.—				
Cuttabung Water System £42 17 5				
Concrete Irrigation 44 4 9				
New Dairy Road and Bridge 48 1 9				
Installation Electric Lights 51 0 3				
Sundries 37 7 9	223 11 11			
Tools and Implements: Repairs and Replacements ..	52 6 9			
Vehicles and Harness: Repairs and Replacements ..	79 16 8			
General Repairs	260 0 5	1,000	970	938 19 10
Live Stock Purchases		300	784	8 2 9
Miscellaneous—				
Truck (Repairs and Wkg. Expenses.) ..	93 18 2			
Rent (Comn. etc.)	40 6 0			
Butter, (Ice, etc.)	10 7 9			
Budding B. Mangoes	61 1 11			
Taxes	10 12 0			
B. Mangoes (Comn. etc.)	56 19 1			
Show (Knutsford Park)	44 5 1			
Jamaica Government (Repayment) ..	70 11 5			
Sundries	255 9 5	600	644	643 10 10
		5,043	6,484	5,670 15 0
Balance: In Bank	2,131 6 6	..	..	2,131 6 6½
In Hand	0 0 0½	..	..	
				7,802 1 6½

N. B. Donaldson, Accountant.

H. H. Cousins, Director of Agriculture.

Hope Stock Farm, Year 1928-29, ended 31st March, 1929.

Profit and Loss Account.

To Depreciation—	£ s. d.	£ s. d.	By Pasturage	£ s. d.
Buildings	51 10 8		Rents	40 0 0
Machinery	86 0 7		Bank Interest	64 14 3
Furniture and Fixtures	37 1 1		Dipping (Fees)	49 6 9
Truck	25 0 0		Butter	1 9 10
Tools and Implements	25 13 2		Bombay Mangoes	42 6 6
Vehicles and Harness	25 17 0	251 2 6	Rearing Calves for Grove Place	185 16 11
Repairs and Upkeep—			Milk	14 10 0
Buildings	0 12 0		Live Stock	5,207 17 8½
Machinery	69 1 0		Miscellaneous Revenue	515 15 2
Furniture and Fixtures	1 2 2		Poultry	11 14 3
Truck	53 3 2			48 1 1
Tools and Implements	18 1 11			
Vehicles and Harness	59 9 8			
General Repairs	260 0 5	461 10 4		
Food for Stock (consumed)		2,025 14 4		
Plantation (Pines)		10 5 10		
Clerk		40 0 0		
Accountant		50 0 0		
Wages		921 17 1		
Cleaning and Fencing as per Cash A/c	482 9 9			
Plus due R. E. Harvey for posts	17 10 0	499 19 9		
Budding Bombay Mangoes		61 1 11		
Taxes		10 12 0		
Rearing Calves by Grove Place		151 3 0		
Foreman's Salary		131 5 0		
Miscellaneous Expenses		166 15 5		
Show (Knutsford Park)		44 5 1		
Balance (Net Profit for the Year)		1,356 0 2½		
		6,181 12 5½		6,181 12 5½

N. B. Donaldson, Accountant.

H. H. Cousins, Director of Agriculture.

Balance Sheet.

Assets.	£ s. d.	£ s. d.	*Liabilities.*	£ s. d.	£ s. d.
Buildings—			Jamaica Government—		
As at 31.3.28	2,168 8 1		Balance of Grant for purchasing Live Stock	1,983 19 3	
Additions	253 11 1		Plus amount in hand for sale, Lembach	125 0 0	
	2,421 19 2			2,108 19 3	
Depreciation	51 10 8	2,370 8 6	Less Bull bought for Stud Farm in Manchester during year	70 11 5	2,038 7 10
Machinery—					
As at 31.3.28	719 5 5		Accounts Payable—		
Depreciation	86 0 7	633 4 10	Treasurer for New York Agents	647 13 9	
Furniture and Fixtures—			Fernando Castro	1 3 8	
As at 31.3.28	391 4 0		R. E. Harvey	17 10 0	666 7 5
Additions	222 9 9		Profit and Loss—		
	613 13 9		As at 31.3.28	11,953 8 5	
Depreciation	37 1 1	576 12 8	Add Profit for the Year	1,356 0 2½	13,309 8 7½
Truck—					
As at 31.3.28	50 0 0				
Depreciation	25 0 0	25 0 0			
Tools and Implements—					
As at 31.3.28	116 6 6				
Additions	34 4 10				
	150 11 4				
Depreciation	25 13 2	124 18 2			
Vehicles and Harness—					
As at 31.3.28	302 0 0				
Additions	20 7 0				
	322 7 0				
Depreciation	25 17 0	296 10 0			
Stores and Parts (Stock as per Inventory)		194 16 11			
Food for Stock (Stock as per Inventory)		727 3 10			
Plantation (3 acres Pines)		80 0 0			
Live Stock (as per Certified Valuation)		8,719 10 0			
Accounts Receivable—					
E. Downes	0 13 5				
Jubilee Hospital	2 1 6				
Lunatic Asylum	81 17 8				
Mrs. H. H. Cousins	0 2 1				
General Penitentary	8 0 0				
A. F. Thelwell	0 9 8				
Mrs. L. Powell	0 0 3				
Dr. J. Myers	0 10 0				
R. S. Martinez	1 2 6				
Public General Hospital	39 15 4	134 12 5			
Cash		2,131 6 6½			
		16,014 3 10½			16,014 3 10½

H. H. Cousins, Director of Agriculture.

N. B. Donaldson, Accountant.

VIII.—GOVERNMENT LABORATORY.

Report of the Deputy Island Chemist.

The total number of samples analysed during the year ended 31st December, 1929, was 2,549, and compares with the two former years as under:—

1927.	1928.	1929.
2,407	2,659	2,549

The samples are classified as follows:—

"A" Official.

(I) *Police*—	
Human viscera and organs	57
Stomach contents and vomits	2
Animal viscera	2
Substances for poison	26
Coins, genuine	57
Coins, counterfeit	315
Counterfeiting exhibits	205
Arson exhibits	34
Lead cables and shot	8
Motor car parts, etc.	7
Rubber Cement	1
Under the Gunpowder and Firearms Law.	
Dynamites	75
Fuses	15
Under the Spirit License and Rum Duty Laws.	
Rums	15
Whisky	5
Wines and Spirits	31
Gins and Liqueurs	3
Distillery Products	8
Under the Adulteration of Food and Drugs Law.	
Fresh milks, adulterated	2
Whisky	3
Wines (Ports and Sherries)	29
Under the Dangerous Drugs Law.	
Ganga	99
Ganga exhibits, (pipes, rags, etc.)	15
Opiums	8
Opium exhibits	12
Under the Petroleum Law.	
Gasolines	4
Under the Agricultural Produce Law.	
Orange oils, genuine	5
Orange oils, adulterated	1
Under the Medical Laws.	
Medicines and drugs	20
Total	1,064
(II) *Customs.*—	
Native and other wines	55
Rectified spirits and Absolute alcohols	17
Industrial alcohols	13
Fuel Oils	29
Gasolines	14
Sugars and syrups	5
Condensed milks and creams	4
Flavouring extracts and essences	6
Disinfectants and Insecticides	4
Spirits	3
Miscellaneous	2
Total	152

(III) *Department of Science and Agriculture.*—

Animal viscera	6
Feeding stuffs	5
Waters	3
Insecticides	1
Instruments (for test)	1
Butters	1
Substances for poison	1
Miscellaneous	2
Total	20

(IV) *Island Medical Department.*—

Waters, potable	5
Soaps	6
Insecticides and rat poisons	11
Medicines	3
Vomits	1
Instruments (for tests)	2
Total	28

(V) *Medical Officers of Health.*—

Kingston.—

Fresh Milks, genuine	6
Do. adulterated	5
Flours, genuine	7

St. Andrew—

Fresh Milks, genuine	35
Do. adulterated	19
Flours, genuine	9
Coffee, genuine	3
Total	84

Other Parishes—

Waters, potable	11
Condensed milks	2
Medicines	1
Total	14

(VI) *Department of Public Works.*—

Waters, potable	1
„ Mineral	2
„ for salinity	46
Brines	6
Sulphuric Acids	2
Total	57

(VII) *Kingston and St. Andrew Corporation.*—

Waters, potable	18
Tars and tar by-products	7
Gas pipes	8
Powders	1
Total	34

(VIII) *Inspectors of Agricultural Produce.*—

Orange oils, genuine	2
„ adulterated	8
Cask washings	1
Annatto	3
Total	14

(IX) *Jamaica Government Railway.*—	
Waters, potable	1
Total	1
(X) *Prisons Department.*—	
Waters, potable	1
Temper Limes	1
Total	2
Total Official ..	1,470

"B" AGRICULTURAL.

Soils and sub-soils	27
Artificial manures and fertilizers	19
Agricultural limes and marls	7
Molasses and cane juices	16
Distillery Products	4
Total ..	73

"C" GENERAL.

Stock Farm milks	535
Cattle dips	78
Rums	146
Sugars	106
Fresh milks	8
Waters, potable	9
„ industrial	10
„ mineral	1
Steam Coals	5
Wines and Spirits	11
Condensed Milks, Creams, and Milk Powders ..	5
Oils, Orange	20
„ Pimento	7
„ Fuel and Mineral	3
Copra	4
Pimento leaves (for distillation)	6
Medicines	3
Substances for poison	8
Minerals and Ores	12
Fruit and fruit juices	3
Plant extracts	3
Miscellaneous	23
Total ..	1,006
Grand Total ..	2,549

The 57 analyses of human viscera and organs, and 2 of stomach contents and vomits were made in connection with 32 deaths. In 19 cases poison was found and determined in the viscera as follows:—

(1) 0.03 grains Arsenic from the organs of a female adult.
(2) 0.006 grains Arsenic from a young woman.
(3) 0.006 grains Arsenic from a female child.
(4) 0.98 grains Arsenic from the viscera of a male adult. (suicide).
(5) Traces of Arsenic from the organs of a female.
(6) 0.01 grains Arsenic from the viscera of a male child.
(7) 0.002 grains Arsenic from the viscera of a female adult.
(8) 0.003 grains Arsenic from the organs of a male adult.
(9) Urechitoxin (Nightshade) from a female child.
(10) Traces of Hydrocyanic Acid and 0.002 grain Arsenic from the viscera of a male infant.
(11) 1.84 grain Arsenic from the organs of a female adult who had been given a dose of Cooper's Dip in mistake for medicine.
(12) 0.0082 grain Phosphorus from the viscera of a male adult.
(13) 2.1 grains Arsenic from the organs of an adult female suicide. (Cooper's Dip).
(14) Ganga Resins from the stomach of a female lunatic.
(15) Large traces Ganga Resins from the stomach of a female lunatic.
(16) 0.04 grain Yellow Phosphorus from the viscera of a male adult.
(17) 0.03 grain Phosphorus from the organs of a male adult.
(18) 0.018 grain Phosphorus from the viscera of a male adult.
(19) 0.006 grain Yellow Phosphorus from the organs of a female adult.

The substances examined for poison which gave positive results were as follows:—

(1) 38 grains ground glass in cooked food.
(2) Arsenic (Arsenite of Soda) 0.31 grain per oz. in Cassava.
(3) Arsenic (Arsenite of Soda) 0.26 grain per oz. in Cassava.
(4) 0.31 grains Antimony in a medicine.
(5) Large traces of Arsenic in the excreta of a female suicide.
(6) Large traces of Ptomaines in cooked fish.
(7) Traces of Carbolic Acid in a cup.
(8) 24 grains Carbolic Acid and powdered glass in a liquid.
(9) 7.4 grains Arsenic (Cooper's Dip) in cooked porridge.
(10) 15.13 grains Arsenic in a liniment which was found to consist of a mixture of liniment 30% and Cooper's Dip 70 %.
(11) 29 grains powdered glass in cooked rice and peas.

The 2 animal viscera examined were submitted in connection with an attempt to poison a man. Food which was suspected of being poisoned was given to two ducks which died after consuming the same. Analysis of the viscera of the ducks revealed large traces of arsenic.

214 Certificates were issued to the Police for use in prosecutions, being an increase of 31 over the number for 1928, and 75 more than in 1927. This does not include 24 Certificates issued to the Medical Officers of Health Departments for Kingston and St. Andrew in respect of adulterated milks.

The large number of coins submitted by the Police of which 315 were counterfeit and 57 genuine, together with 205 exhibits for the manufacture of spurious coins were largely due to the activities of a more dangerous type of counterfeiter than had been hitherto found in Jamaica. These counterfeit coins were composed of an alloy of silver, copper, and tin, and in most cases were silver plated. Some counterfeit gold coins, resembling $20 and $5 pieces of the United States which were made of base metals plated with gold or silver were also received. The activities of the Police resulted in the arrest of these gangs of coiners in Kingston, St. Andrew and Clarendon, and the seizure of their implements which include alloys of silver with copper and tin, moulds, blowpipes and various acids and other chemicals. An undesirable alien who could not speak English was arrested in the act of moulding spurious coins resembling coins of the United States currency, which were clearly intended to be finished off by a gold plating process.

In consequence of the larceny of a quantity of lead, covered cable samples were analysed and also samples of lead shot with a view to ascertaining whether the shot had been manufactured from lead from the cable.

Assistance was given to the Police in a prosecution for Manslaughter in establishing the fact that a certain motor car collided with a particular wooden post. Traces of tar on the bumper were found identical with the tar from the splinters from the post, and also the identity of a fragment of glass, which was found wedged in the car, with other broken glass found on the ground at the scene of the fatality, was established.

The 75 sticks of Dynamite and 15 Fuses were submitted in connection with a breach of the Explosives Law, and were part of a consignment which was salved from a wrecked schooner.

Under the Spirit License Law, 62 samples were analysed. These included samples submitted in an interesting case concerning the illicit manufacture of Rum. A crude distillery was located in a cave in St. Catherine, and analysis of the contents of the still, receivers and other vessels found, established the fact that Rum was being illegally manufactured by "Moonshiners."

34 samples, chiefly wines and spirits, were analysed under the Adulteration of Food and Drugs Law.

The number of Ganga samples and exhibits show a great decrease as compared with the past two years, ganga samples being 99 as against 639 for last year, whilst the number of ganga pipes and exhibits is 15 as against 30.

The smoking of ganga admixed with tobacco in cigarettes seems to be prevalent.

The 8 samples of Opium and 12 pipes which had been used for smoking opium were submitted in connection with a raid on an opium den in Kingston.

4 samples of Gasoline were submitted in cases of seizures for breaches of the Petroleum Law.

Of 6 samples of Orange Oil submitted for test under the Agricultural Produce Law one was found to be adulterated with 15 per cent. of kerosine. Two of the samples consisted of mixtures of bitter and sweet orange oils.

20 samples were submitted in connection with cases for breach of the Medical Law. These included preparations of Kola, Coffee, Terebene, Asafoetida, Ginger, Castor oil, Alum, a 3 solution of Copper Sulphate, Ferrous Sulphate, Acetanilide, Sodium Salicylate, Ferric Chloride, a lotion of Lead Acetate, and Urine.

Samples from the Customs numbered 152 as against 163 for last year. The decrease is chiefly accounted for by the fewer number of alcohol samples only 30 samples being submitted as against 45 for last year. Fuel Oils and Gasolines show an increase from 39 to 43.

The 6 analyses of animal viscera for the Department of Science and Agriculture were made in connection with deaths amongst stock. Arsenic was found in one case. The feeding stuffs comprised coconut cake and also feeding stuffs prepared from molasses.

28 analyses were made for the Island Medical Office, and included 11 analyses of various rat and vermin poisons for the nature and content of the poisonous constituents.

The Medical Officers of Health for Kingston and St. Andrew submitted 84 samples of food stuffs. Out of 65 samples of milk 24 were found to be adulterated by the addition of water, in some cases as much as 30 % added water being found.

Assistance was given to the Department of Public Works in checking the guaging at Hermitage and Constant Spring by chemical methods, and 54 tests were made.

The usual quarterly analyses of the Kingston and St. Andrew water supplies, both crude and filtered waters, were carried out, and the results indicated that the corporate area is supplied with water of excellent quality.

An investigation into the utilisation of bye-products from the Kingston Gas Works was made with a view to using local tar for street construction and the preparation of insecticides and fungicides from the tar oils.

14 samples were examined for the Inspector of Agricultural Produce. Out of 10 samples of Orange Oil, 8 were found to be adulterated, the adulterants comprising kerosine, terpenes and turpentine substitutes.

Samples of water from a well sunk at the Jamaica Government Railway were analysed and found to be satisfactory.

A sample of Temper Lime prepared by the Prisons Department was analysed with a view to ascertaining its suitability for use on Sugar Estates. Its freedom from sulphates, and low content of magnesia and silica, indicates that it was suitable for use in clarifying sugar juices.

Agricultural.

73 samples were analysed under this head, being a decrease of 4 as compared with the number for 1928.

Complete physical and chemical analyses were made of a number of soils submitted by a large Fruit-growing Company.

General.

Under this heading 1,006 samples were analysed. Stock Farm Milks numbered 535 as against 736 for last year, being a decrease of 201 samples. The quality of milk from this source has maintained its usual excellent standard. Excluding the Stock Farm milk samples, this heading shows an increase of 159 samples above the number analysed in 1928.

Rum samples, analysed for their ether content, numbered 146 as against 127 for last year.

Sugars remained about the same, being 106 as compared with 105.

Pimento leaves were received from six different properties for a practical test as to the yield of oil and Eugenol content.

12 samples of Minerals were analysed including two for assay of their silver content.

Analyses were made of 10 samples of boiler feed waters, and a complete analysis was made of a mineral spring water taken from the "Boilers" at Alligator Pond.

During the year the fumigation of imported plants, fruits and vegetables was carried out at the Fumigatorium at the Railway Wharf by means of Hydrocyanic Acid gas. The total number of articles fumigated is as follows:—

Crates of Onions	216
Baskets of Garlic	81
Sacks of Potatoes	10
Boxes of Apples	1
Coconut Palms	3
Christmas Trees	3
Total	314

Experiments were made, based on the analysis of various brands of insecticides, with a view to making an effective fly poison for the use of the Public Hospital at a much cheaper cost than the trade articles. As a result it has been found possible to produce an efficient fly killer at about one quarter of the cost of the proprietary insecticides obtainable hitherto. Practical trials at the Public Hospital and also the Government Farm School have demonstrated that the Laboratory preparation is as good as, if not superior to, the brands of imported insecticides.

Seventy-eight samples of Cattle Dip were tested for owners of Dipping Tanks, being an increase of 16 over last year. Suitable recharges of Arsenite of Soda and Paranaph were advised.

Five samples of steam coal and three fuel oils were analysed for various shipping companies.

Arsenite of Soda was sold in original drums to registered owners of Dipping Tanks, and the manufacture of Paranaph was continued as usual. These insecticides, Paranaph and Arsenite of Soda, are sold at cost price for use in preparing the Cattle Dips throughout the Island.

The following table shows the nature and amounts of materials issued to the public for the past three years:—

	1927.	1928.	1929.
Paranaph	29,954	37,353	37,849 lbs.
Arsenite of Soda	17,475	21,900	21,725 lbs.
Copper Sulphate	451	198	275 lbs.
Carbon Bisulphide	559	847	492 lbs.
Rat poison in bulk	396	341	265 lbs.
Rat poison, 1 oz. pkts.	272	96	nil pkts.
Standard Iodine solution ..	34,750	46,950	47,750 ccs.
Thymol powders	325	260	330 ozs.
Starch solution	193	248	237 bottles
Soda Bicarbonate	39	60	58 bottles

The receipts for Laboratory Fees and Sales for the past three years are as follows:—

	1927.	1928.	1929.
	£ s. d.	£ s. d.	£ s. d.
Laboratory Fees ..	201 10 0	213 0 0	204 1 0
Laboratory Sales ..	886 7 9	1,025 0 0	937 19 9

The Staff at the Laboratory is the same as last year, namely, the Deputy Island Chemist, two Assistants, Clerk and two Apprentices.

The Assistant to the Deputy Island Chemist, Mr. E. N. Richards, was absent on vacation leave from the 4th June to the 3rd October, during which time Mr. H. B. Cole officiated in his place.

W. Leigh Barnett, M.A., B.Sc., F.I.C.
Deputy Island Chemist.

IX. STAFF.

The following changes of staff took place during 1929:—

Head Office.—Miss D. E. Golding, who for seven years had served as Typist and Stenographer in the Head Office, resigned on 31st May owing to ill-health. She was succeeded by Miss V. M. Barrows.

Miss V. L. Crosskill was appointed Temporary Clerk vice Miss M. A. Sinclair, retired.

Inspectors of Plant Diseases.—Mr. E. M. Brown was appointed to act as Assistant Conservator of Forests and Mr. A. G. Benjamin retired from the Service. The vacancies were filled by the appointment of Messrs. C. W. J. Bewley and C. J. Case as Inspectors of Plant Diseases. The staff was strengthened by the appointment of an Additional Inspector of Plant Diseases, Mr. A. D. Arnaud being appointed to the new post.

Government Laboratory.—Mr. W. H. Edwards, who was appointed Government Entomologist vice the late Mr. C. C. Gowdey, arrived in the colony and assumed his duties on the 29th May.

Mr. V. A. Nelson, Clerk and Storekeeper, was promoted to a Second Class Clerkship and transferred to the Government Savings Bank in December. Mr. C. L. A. Rennalls was appointed to fill the vacancy.

Hope Stock Farm.—Mr. N. F. Ottey was appointed Foreman vice Mr. D. N. Brown.

Vacation Leave.—Mr. N. B. Donaldson, Accountant, and Mr. R. A. White, Assistant in the Head Office, obtained leave for one month and six weeks respectively. Miss E. Marson, Assistant in the Office of the Superintendent of Public Gardens was granted three months leave.

Mr. T. P. Lecky, Foreman of the Farm School, obtained leave for one month.

Mr. F. E. V. Smith, Microbiologist obtained leave and was absent from the colony from the 20th June to 15th December. During a portion of this period he attended the Imperial Mycological Conference in London and was also engaged in special research work.

Mr. E. N. Richards, Assistant to the Deputy Island Chemist, was granted leave for four months and and Mr. H. B. Cole, Technical Assistant was granted leave for one month.

H. H. Cousins,
Director of Agriculture and Island Chemist.